

The DENTAL DIGEST

VOLUME 42

July, 1936

NUMBER 7

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AN ORAL HYGIENE PUBLICATION. Published monthly on the fifteenth by Dental Digest, Inc. Copyright, 1936, by Dental Digest, Inc. Entered as second class matter at the Postoffice at Ashland, Ohio, under the Act of Congress, March 3, 1879. PUBLICATION OFFICES: 1005 Liberty Avenue, Pittsburgh, Pennsylvania. Merwin B. Massol, Publisher; Associates: J. J. Downes, W. Earle Craig, D. D. S.; R. C. Ketterer, Publication Manager. Subscriptions should be sent to the Publication Offices, 1005 Liberty Avenue, Pittsburgh, Pennsylvania. Manuscripts and correspondence regarding editorial matters should be addressed to the editor at 708 Church Street, Evanston, Illinois. Subscription, including postage: \$2 per year in the United States, Alaska, Cuba, Guam, Hawaiian Islands, Mexico, Philippines, Puerto Rico. To Great Britain and Continent, \$2.75; Canada, \$2.00; Australia, \$2.75. All other countries, \$2.75. Single copies, 25c. DISTRICT ADVERTISING OFFICES: *Chicago*: Peoples Gas Building; W. B. Conant, Western Manager. *New York*: 18 East 48th Street; Stuart M. Stanley, Eastern Manager. *St. Louis*: Syndicate Trust Building; A. D. McKinney, Southern Manager. *San Francisco*: 155 Montgomery Street. *Los Angeles*: 318 West 9th Street; Don Harway, Pacific Coast Manager.

SURGICAL ERUPTION OF ABUTMENT TEETH

S. MARSHALL WEAVER, D.D.S.
Cleveland

THE operation for eruption of abutment teeth is applicable to all short abutment teeth where the gum tissue and alveolus encroach on the enamel cap of the teeth, making it impossible to construct normal and esthetic bridge abutments. So far as I know, this is an original application of alveolar surgery, and one that has given me a great deal of satisfaction.

REPORT OF CASE

The accompanying photographs are descriptive of the treatment of a practical case in a young girl, from the age of 12 to 17 years.

History—The visual diagnosis at

12 years presented no difficulties, but as a matter of routine, a full roentgenographic examination was made which disclosed the congenital absence of all bicuspids except one small malformed tooth that was later removed.

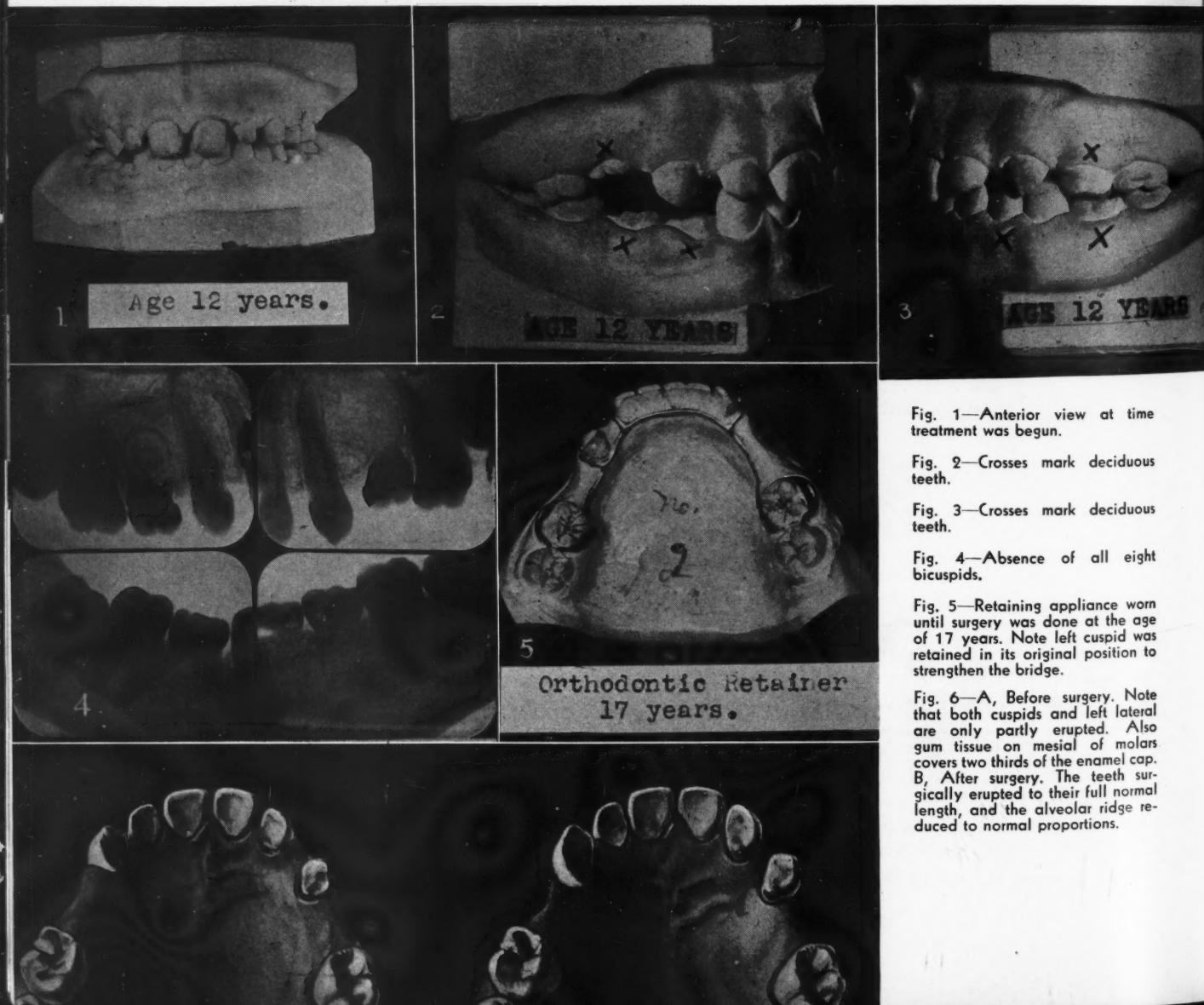
Orthodontia—The orthodontia was planned especially for the placement of bridges. Whether the bridge was to be the fixed or removable type was left for later decision.

The upper left and lower left cuspids were left in their original positions, as they were in the first bicuspid region and in good upright position. I planned to place a three-

quarter jacket restoration on the cuspids to change them to bicuspids. The result is seen in the photograph of the finished case. By doing this, these teeth did not have to be moved, and the restoration is stronger.

Orthodontia was completed in about two years, and space maintainers were worn until the age of 17 years. As much natural development as possible was permitted.

Conditions—The case at this time presented plenty of space mesio-distally between the abutments, as this was maintained by the orthodontic appliances; but the length of the eight abutment teeth was insufficient



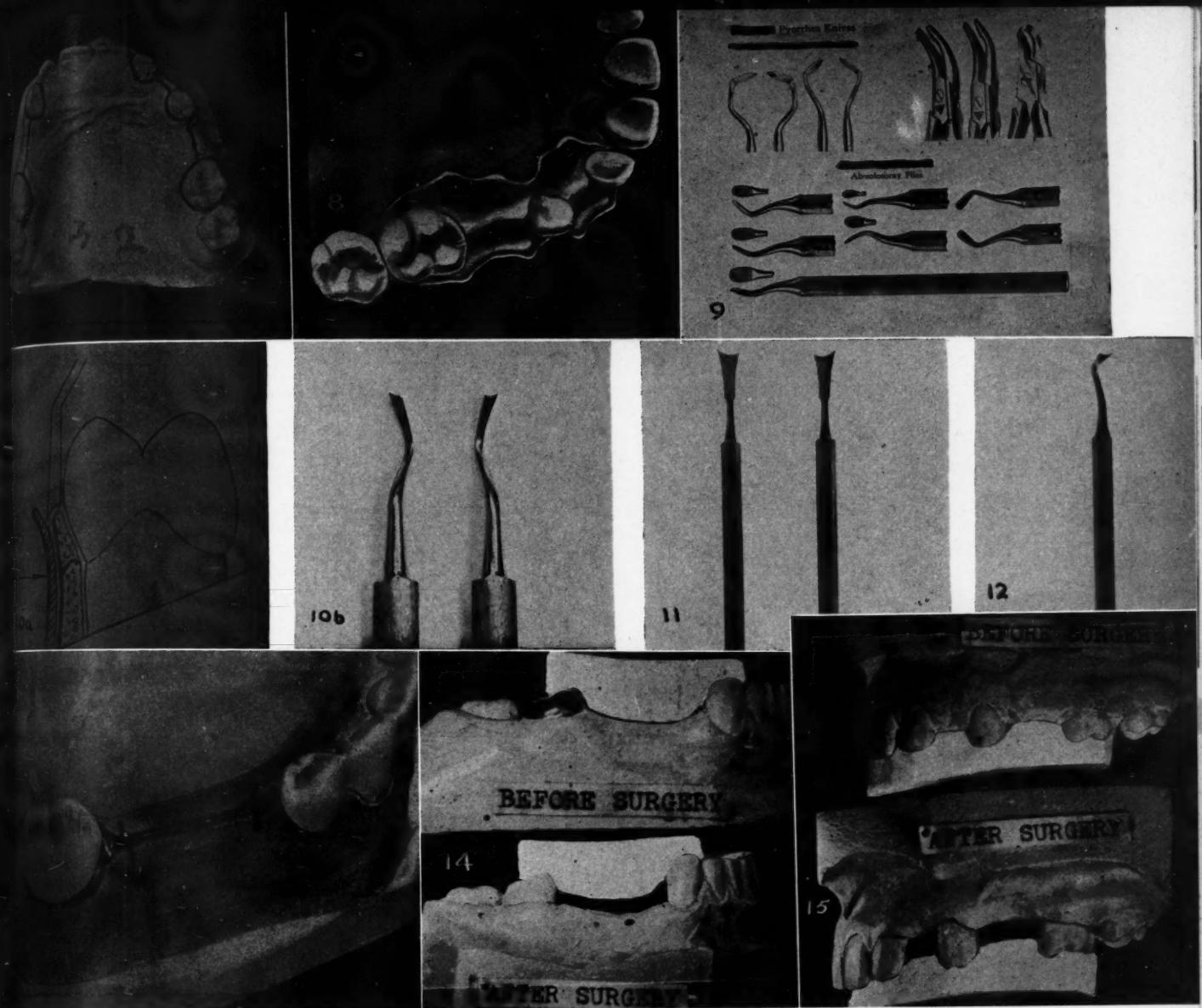


Fig. 7—Black lines show the initial incision on the upper.

Fig. 8—Retraction of gum tissue preparatory to reduction of alveolus. Note gum tissue retracted to distal of molar, both buccally and lingually, also to mesial portion of lateral incisor. This enables the operator to remove the enveloping process down to the cemento-enamel junction as in normal teeth. This must be finished with the same gentle curve. The dotted line shows where the incision is first made.

Fig. 9—Instruments used in reducing the alveolus.

Fig. 10—A specially designed instrument for the removal of the alveolar crest where the teeth are being surgically erupted, as illustrated in drawing. The short, or inner angle is slightly dulled to avoid injury to the enamel, and the handles are especially shaped so as not to turn in the hand.

Fig. 11—Two chisels used to trim the alveolus around necks of the teeth.

Fig. 12—Another chisel, especially designed to reduce the alveolar ridge and leave the crest with a rounded surface.

Fig. 13—Surgery completed and sutures in position. Dark line represents the blood clot, and this is the important point for a scarless operation and a tightening of the tissue over the ridge and around the necks of the abutment teeth. Flaps are cut about 2 mm. short, continuing around to distal of molar and mesial of bicuspid. Stitches should merely hold flaps in place and not pull them together. If this technique is carried out, when the blood clot starts to shrink and healing begins, the flaps will be pulled together without a sign of a scar, which is a desirable feature.

Fig. 14—The same plaster index was used on the two casts. The dark area represents the amount of tissue removed.

Fig. 15—Note surgical eruption of lateral, cuspid, and molar—all to a normal condition, and also the space made for a normal cuspid pontic. The cuspid was made into bicuspid with a three-quarter gold jacket.

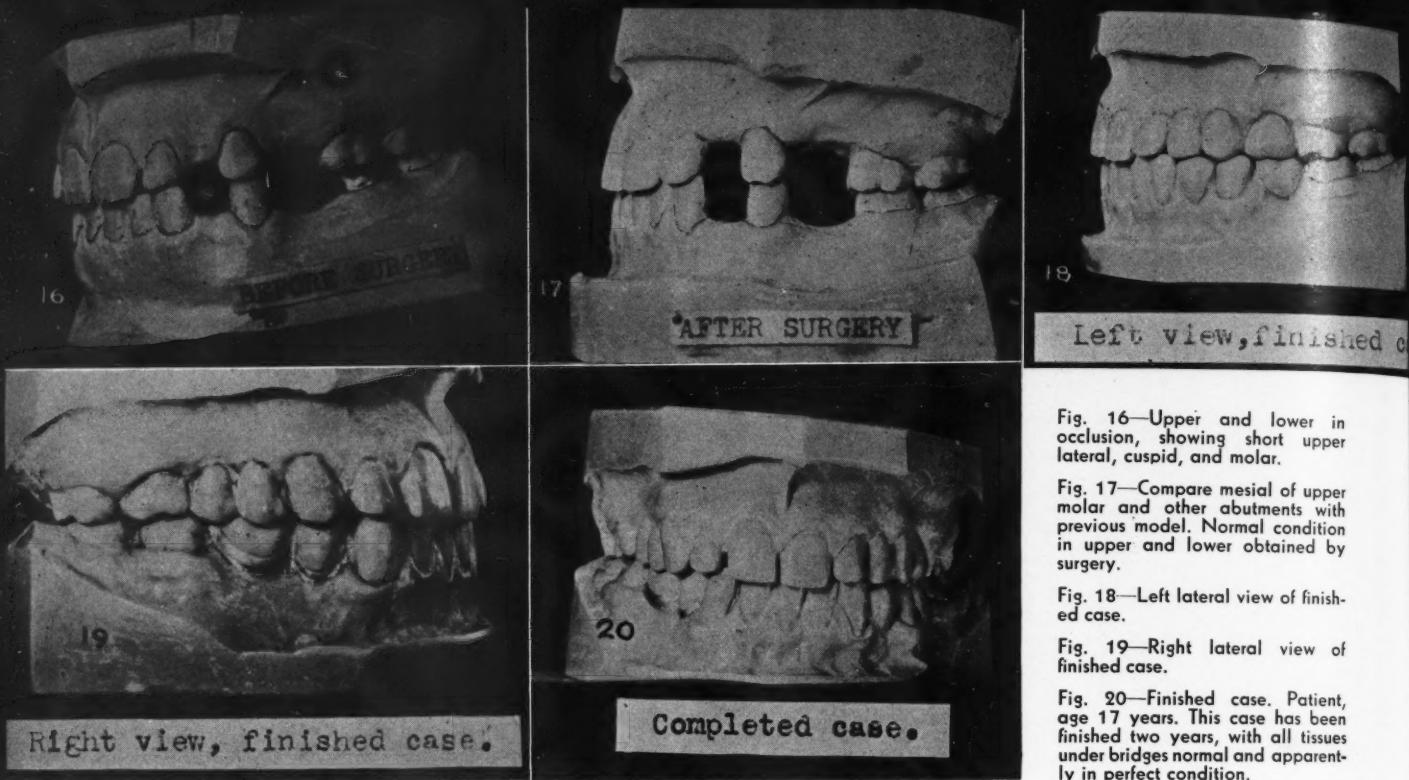


Fig. 18—Left view, finished case.

Fig. 16—Upper and lower in occlusion, showing short upper lateral, cupid, and molar.

Fig. 17—Compare mesial of upper molar and other abutments with previous model. Normal condition in upper and lower obtained by surgery.

Fig. 19—Right lateral view of finished case.

Fig. 20—Finished case. Patient, age 17 years. This case has been finished two years, with all tissues under bridges normal and apparently in perfect condition.

to admit placement of any abutments; also there was insufficient space between the upper and lower alveolus to receive an esthetic pontic. It should be borne in mind that these teeth were all in good occlusion.

Treatment—Full mouth roent-

genograms were again taken, and it was decided to remove enough bone and gum tissue between and around these abutments to produce a completely normal condition for the reception of esthetic and durable bridges.

Results—The accompanying illustrations show what was done. At the 1936 Midwinter Meeting in Chicago, this patient was shown, eighteen months after completion of the case with all gum tissues normal, and ideal esthetics.

B. F. Keith Building.

ABOUT OUR CONTRIBUTORS

SAMUEL MARSHALL WEAVER, D.D.S. (Western Reserve University School of Dentistry, 1899) taught for two years at his alma mater. Doctor Weaver is the author of numerous articles on such diversified subjects as anesthesia; crown and bridgework; surgical treatment of close bites; relation of teeth to health; dental equipment; root filling; and antrum and alveolar surgery.

Perhaps Doctor Weaver's most noteworthy contribution, however, occurred during the World War, when as chairman of the Ambulance Committee of the Preparedness League of American Dentists in 1917, he designed and built the Standardized Dental Ambulance, which was accepted by the War Department of the United States. Seventeen were sent overseas before the Armistice. Doctor Weaver is likewise the designer of the first automobile dispensary for child hygiene activities in the country. His latest contribution is the designing of the

study rooms for the Division of Advanced Dental Education in Cleveland.

Doctor Weaver has a general practice in which precision removable bridgework is emphasized. He is a member of the American Dental Association and component societies, past-president of the Cleveland Dental Society (1913); member of the American Academy of Restorative Dentistry; honorary member of the American Dental Society of Europe.

CLARENCE FRANK TUMA, D.D.S. (Western Reserve University School of Dentistry, 1928) has previously contributed several practical suggestions in these pages: A BASE FOR SMALL DEMONSTRATION MODELS, March; REMOVING AMALGAM CARVINGS, April; AN INK REMOVER AND A STERILIZER, and SHEET RUBBER LABORATORY AIDS, July—all in 1932; A HANDPIECE STERILIZING BOTTLE, November, 1933. Doctor Tuma is a member of

the American Dental Association, and has a general practice with special attention to the construction of artificial dentures.

JOSEPH E. SCHAEFER, D.D.S., M.D. (Chicago College of Dental Surgery, 1907; Rush Medical College, 1923) is a regular contributor to THE DENTAL DIGEST and is familiar to readers of these pages. His most recent article, on RESTORATIVE PROSTHESIS, was published in the April, 1936 issue.

JOHN H. NESSON, D.M.D. (Harvard University Dental School, 1922) previously published a serial article, WHAT THE DENTIST SHOULD KNOW ABOUT THE LAW. This appeared in the September, October, and November, 1934 issues of the DIGEST. Doctor Nesson attended the Suffolk Law School from 1930 to 1932.

STAINLESS STEEL WROUGHT CLASPS

C. FRANK TUMA, D.D.S.

Cleveland

MAN has advanced from bronze, to iron, to steel, and is now delving into the use of alloys. Man has used alloys since he first used metal for tools as many metals are found in nature combined with other metals, but it is only recently that concerted scientific research methods have been employed. In industry, most of our advanced mechanical devices have been vitally dependent on alloys, either in the tooling of the product or in the finished product itself. Witness the modern automobile, the streamlined train, or any aircraft. In dentistry, we need only think back to the early coin-silver amalgam filling, the "Royal Mineral Succedaneum," which the charlatans first exploited and which has, by scientific research, become our modern balanced alloy, dentistry's most valuable material. The employment of a partial denture clasp of burnished gold with solder reinforcement would not now be considered, because our modern wrought or casting alloys permit of strong yet protectively delicate construction.

Heretofore, the only metals that possessed the physical properties which made them suitable for use in the construction of prosthetic appliances have been the noble metals, mainly gold and the platinum group in various alloy combinations. Recently, in the pursuit of permanence as an ideal, research workers have developed alloys of chromium and iron, with or without nickel, and have made available for industrial purposes a class of materials combining unusual resistance to corrosion with desirable physical properties. A few of these have characteristics which suggest that they may be utilized for dental appliances. One alloy in particular, composed of iron with approximately 18 per cent chromium, 8 per cent nickel and fractional percentages of manganese, silicon, and carbon has desirable characteristics and is called 18-8, because of the percentages of the principal alloying metals, chromium and nickel.

USS Stabilized 18-8¹ is a modifi-

cation of the regular 18-8 analysis and is designed for maximum dependability when the alloy is to be welded or subjected to temperatures of from 1000° F. to 1600° F. during fabrication or service. Incorporation of a small percentage of titanium, together with a suitable heat treatment, completely immunizes the alloy to corrosive attack, and the stabilized alloy should be used whenever these intermediate temperatures are to be imposed on the alloy. When the alloy is not to be subjected to these temperatures, use of the regular 18-8 is recommended because of its slightly greater general immunity to corrosion.

ADVANTAGES

1. The excellent chemical stability in the mouth of either of the alloys mentioned assures the wearer of complete absence of toxic effects, which was formerly obtained only through the use of the precious metals.

2. Their resistance to tarnish in service is far superior to that of the recently developed low-cost gold or palladium-silver alloys. We need not be concerned further with the chemical analysis of the material because it is only the service that is obtained from the metal which is important, and not its potential value as scrap.

3. The strength of the wrought material is greater than that of most precious metal alloys.² If it is used without annealing, its tensile strength and yield point are approximately double that of a good gold clasp wire and will provide a strong and rigid structure.

4. The elongation of the stainless

*PHYSICAL PROPERTIES OF USS 18-8 STAINLESS STEEL:

Annealed Hard-drawn

1. Ultimate strength in pounds per square inch...85,000-to-300,000
2. Proportional limit in pounds per square inch...40,000-to-225,000
3. Elongation in 2 inches.....60% -to- 1%
4. Brinell hardness.....130 -to- 460
5. Intermediate properties may be obtained by heat treatment or partial annealing after drawing.
6. Thermal conductivity about 36% that of pure iron.
7. Annealing temperature1850° F. -to- 2150° F.
8. Specific Gravity.....7.86
9. Excellent resistance to corrosion in the mouth.
10. Welds readily.

steel alloy is excellent and permits ample resistance to breakage during fabrication or subsequent adjustment. The high ductility of the alloy lends itself to deep drawing or sharp bending; the alloy is stronger than ordinary steel and hardens rapidly; accordingly, more force is required in forming operations. The material cannot be hardened by heat treatment once it has been annealed: cold working alone can restore that hardness.

5. A surface hardness equal to or greater than that of the hardest gold alloys provides a surface resistance to wear and marring.

6. These stainless steel alloys are less than half as heavy as 18 karat gold alloys and about twice as strong and lend themselves admirably to the construction of light weight appliances. This advantage is most admired in large structures, such as swaged bases for completely edentulous mouths, or extensive partial restorations made by the swaged or cast method.

DIFFICULTIES

With all these advantages there are also some difficulties to be overcome which are chiefly associated with the soldering operations often necessary in the fabrication of dental appliances. Briefly, the difficulties are: (1) Stainless steel is more difficult to solder than are gold alloys; (2) electrolytic disintegration occasionally destroys unions originally well soldered; (3) stainless steel is not hardened by heat treatment once it has been accidentally annealed.

MODIFICATIONS

In an effort to utilize the desirable qualities of stainless steel and at the same time to prevent the difficulties that may arise when the new material is handled by methods developed for the precious metal alloys, some changes in design and in technique are obviously needed. Such modifications are therefore suggested: (1) The construction of the clasp and retention tang in one continuous piece of wire, without solder; or (2) the construction of the clasp and tang in two pieces with a simple soldered

¹USS 18-8 is a product of the United States Steel Corporation.

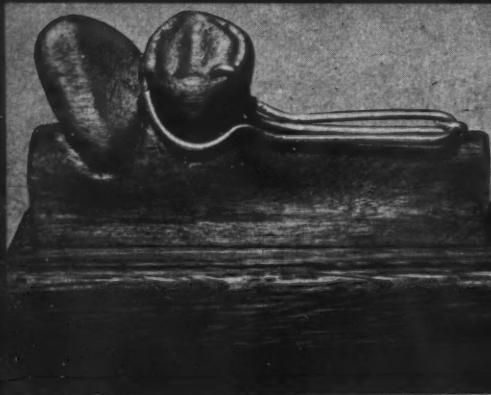


Fig. 1—Conventional clasp. Lingual aspect.

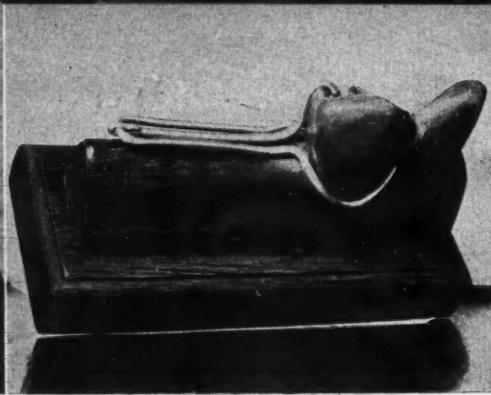


Fig. 2—Conventional clasp. Buccal aspect.



Fig. 3—One-piece clasp. Occlusal rest at end of lingual clasp arm. Lingual aspect.

PHOTOGRAPHS BY RAY HULL

union, the principal function of which is to maintain the parts in the correct relationship until vulcanization has been completed. This minimizes the technical difficulties encountered in soldering. (The brief technique of construction of the Type 4 clasp given at the end of this article will make this clearer.)

In either of these modifications, the use of round wire of relatively light gauge has proved satisfactory, because of greater ease in forming the clasp and tang, and because of inherent advantages in the finished clasp. Round hard-drawn wire, 18 gauge (.040 inch) is employed unless otherwise specified and provides ample strength and rigidity with a minimal tooth coverage. At the same time the round tang may rotate slightly in the enveloping vulcanite and utilize the torsional elasticity of the wire to supplement the clasp flexibility.

These clasps have been found acceptable for bicuspids and are particularly adaptable to posterior extension lingual-bar cases when used in combination with a light but rigid stainless steel wrought lingual bar. A mild but desirable stress breaker action occurs with clasps of Type 2, 3, or 4, which are about to be described.

These modifications have been especially designed to adapt stainless steel to practical and successful denture construction. Any good noble metal wire may be used, however, with the advantage of easy adaptation of the annealed wire and its subsequent heat hardening for service.

Slightly heavier gauge wire should then be substituted.

The modifications of conventional clasp construction are presented as types of designs that may be applied to practical cases, when indicated, with entire satisfaction. Many improvements and additions will undoubtedly suggest themselves.

TYPES

The following are several types of stainless steel wrought clasps:

1. The conventional type (Figs. 1 and 2) has an occlusal rest on an auxiliary arm which is crimped to the tang.

2. The type in which the occlusal rest is at the end of the lingual clasp arm (Figs. 3 and 4) has a mild stress-breaker action. This clasp is constructed of one continuous piece of wire and is somewhat difficult to form.

3. The type in which the occlusal rest is at the end of the labial arm (Fig. 5) and rests in a notch in a gingival inlay or amalgam restoration provides excellent retention with tapering cusps, ordinarily considered difficult to clasp. A mild stress-breaker action occurs in this type.

4. A two-piece variation of type 2 or 3 (Figs. 6, 7, and 8) may be constructed with the solder joint or weld at the farther end of the tang where failure or accidental annealing will do little harm. Each individual tang is retained by a separate right-angle retention bend should the solder fail. Electrolysis is inhibited by an envelope of vulcanite around the solder.

This type permits the use of low-fusing solders (1200° F. or lower), such as silver solder, Paliney solder, or special solders compounded for stainless steel. Soft solder or block tin may be used with a flux of muriatic acid cut with zinc. This construction offers all the advantages of the one-piece construction with less expenditure of effort.

5. The circumferential or crib clasp (Figs. 9 and 10) has two individual round tangs with individual retention bends at the ends of each. Torsional flexibility of each tang is obtained. No solder is employed. This type permits the use of wires of smaller gauges [gauge 19 (.036 inch) or gauge 20 (.032 inch)].

TECHNIQUE OF CONSTRUCTION OF TYPE 4 CLASP

The technique minimizes soldering difficulties and the dangers of annealing the wire.

1. The buccal and lingual clasp-tang pieces are adapted separately. These are bent cold or with moderate heat (not over 600° F.). Keep the tang portion to the lingual of the ridge.

2. Apply sticky wax to the parts in position with tangs in contact.

3. Flow plaster around the whole of the tangs and the retention angles which are kept long until soldering has been completed. When set, remove in one piece from the model.

4. The remainder of the clasp is embedded in plaster. When set, generously expose the tangs for soldering.

Fig. 4—One-piece clasp. Buccal clasp.

Fig. 5—Cuspid clasp. Occlusal rest in gingival notch. Labial aspect.

Fig. 6—Cuspid clasp. Two-piece construction. Lingual aspect.

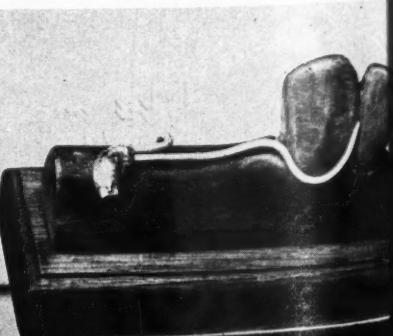
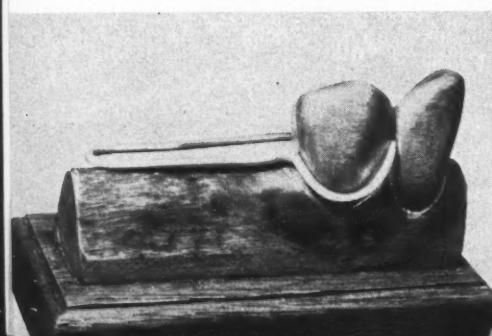




Fig. 7—Two-piece clasp. Lingual aspect.

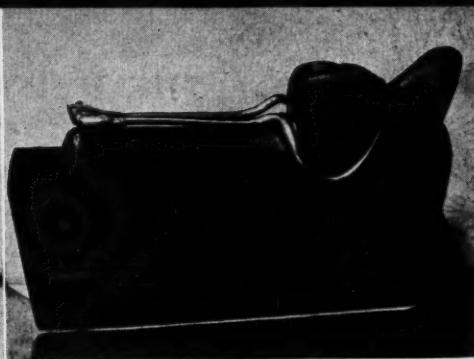


Fig. 8—Two-piece clasp. Buccal aspect.

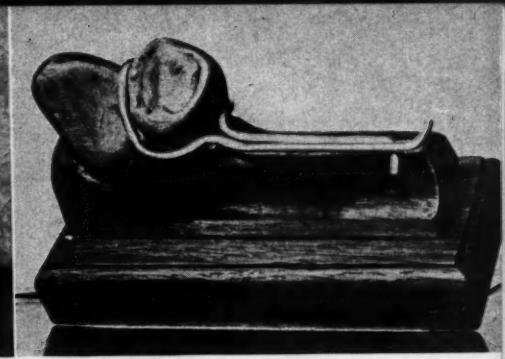


Fig. 9—Crib clasp. Lingual aspect.

5. Flux liberally.³

6. Tack the parts together quickly with solder in the neutral part of an open Bunsen flame. A neutral

³SOLDERING FLUX:

Formula No. 1:	
Potassium fluoride.....	50 parts
Boric acid.....	50 parts
Hydrochloric acid (50% - q. s. to make a thin paste.	
Formula No. 2:	
Potassium fluoride.....	300 grains
Boric acid.....	200 grains
Sodium borate.....	50 grains
Sodium carbonate.....	50 grains
Silica (150 mesh).....	50 grains
Hydrochloric acid.....	20 minimis

13201 Miles Avenue.

acetylene flame is ideal. The investing plaster protects the clasp from overheating and should be moistened before soldering is begun.

7. Pickle.⁴

8. Polish with rubber abrasive wheels.

⁴PICKLING SOLUTION:

Hydrochloric acid (50%).....	100 parts
Nitric acid ⁵	5 parts
Use at approximately 150° F.	

⁵Nitric acid imparts a bright finish to the metal but may be dispensed with if desired.

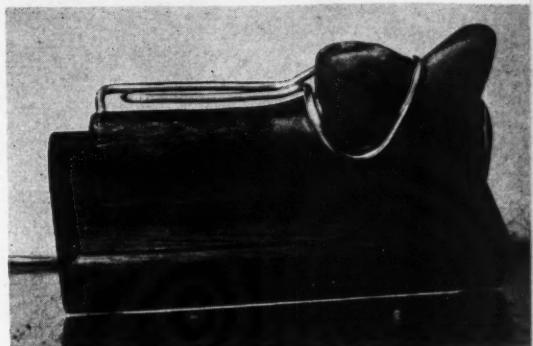


Fig. 10—Crib clasp. Buccal aspect.

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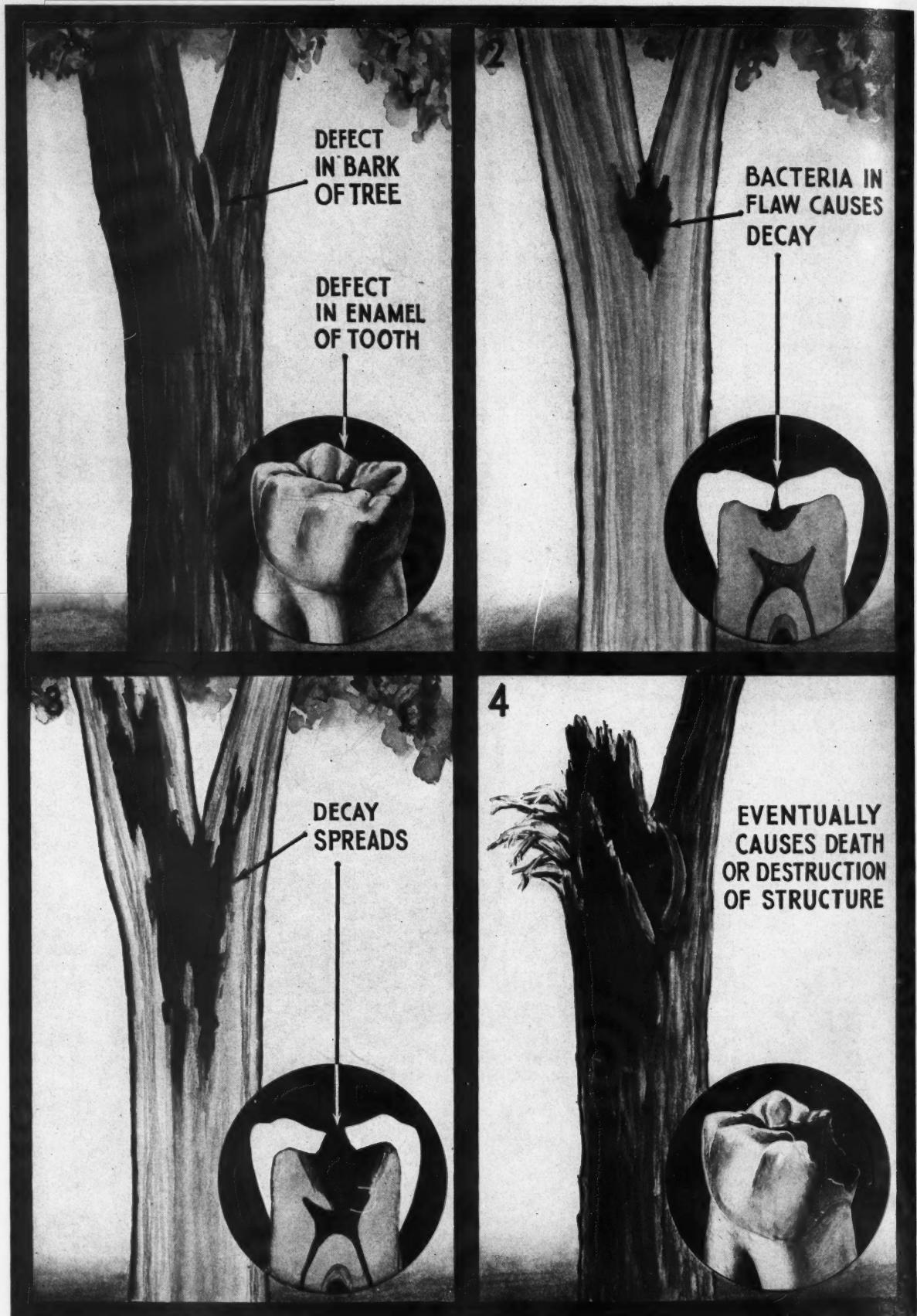
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ANONYMITY: Anonymous manuscripts and communications will not be read.

THE EDUCATION OF THE DENTAL PATIENT

VI. DISEASES OF TEETH AND TREES



*This is the sixth chart in the third series intended for the use of the dentist in explaining important normal and pathologic dental conditions to his patient. The first and second series has been published in booklet form.



THE PRESENT CLINICAL CONCEPT OF FOCAL INFECTION

JOSEPH E. SCHAEFER, M.D., D.D.S.

Chicago

DOCTOR Billings, in 1915, delivered a series of lectures at the Stanford University Medical School, which afterward appeared in a monograph¹ entitled FOCAL INFECTION. Our present concept of focal infection, as a principle of infection, began on that date. It is true that prior to this time observations had been made on the relationship of systemic disease and infected

¹Billings, Frank: Focal Infection. The Lane Medical Lectures, New York and London, F. Appleton & Co., 1916.

teeth, notably by Benjamin Rush, in 1818; but the widespread acceptance of the principle of focal infection did not follow until the report by Billings.

Billings defined a focus of infection as a *circumscribed area of tissue infected with pathogenic micro-organisms*. He further stated that foci of infection may be primary and secondary. Primary foci usually are located in tissues communicating with a mucous or cutaneous surface. Secondary foci are the direct results of

infection from other foci through contiguous tissues, or at a distance through the blood stream of lymph channels.

Billings then proceeded to classify the primary sites. These are all familiar, but from the standpoint of our problem, infected teeth and pyorrhreal pockets were held to be important primary sites. Billings then developed the concept that from these primary sites, either toxins or micro-organisms were disseminated by the blood or lymph channels to the body

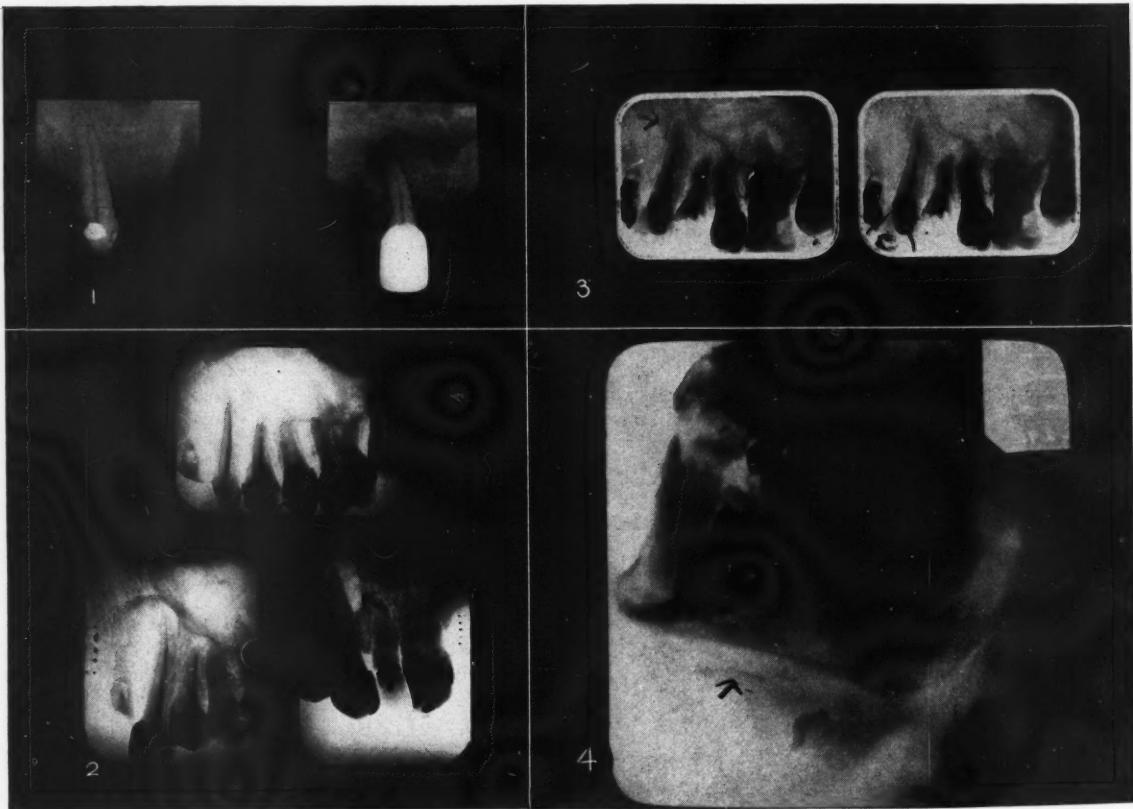


Fig. 1—Bone change due to trauma. Note area of osteoporosis simulating bone destruction that is usually designated as a chronic alveolar abscess (left). Gold attachment removed from tooth and area of rarefaction completely disappeared. The pulp is vital (right).

Fig. 2—Note area of bone destruction about the cuspid (indicated by arrow). This, from the history, had been present for twelve years.

Fig. 3—Root canal was cleaned and refilled. Note area of bone repair (indicated by arrow). This is the same case as shown in Fig. 2. The repair of bone does not follow, in my opinion, any attempt at sterilizing the canal by medicines sealed in the canal. If one keeps in mind the millions of tubules in the dentine, one can hardly conceive of a sterilizing agent powerful enough to penetrate all these tubules.

The repair follows the removal of irritating substances within the canal which keeps up a chronic inflammatory process in the bone. The cleaning of the canal amounts to drainage, the same as in evacuating the contents of a large abscess cavity.

Fig. 4—Roentgenogram of a mandible of a girl, aged 8 years. The patient presented with an external fistula on the face draining from the first molar area. Note large area of bone destruction about the first molar; also note sequestrum along the lower border of the mandible. The lower border of the mandible was left devoid of cortical bone.

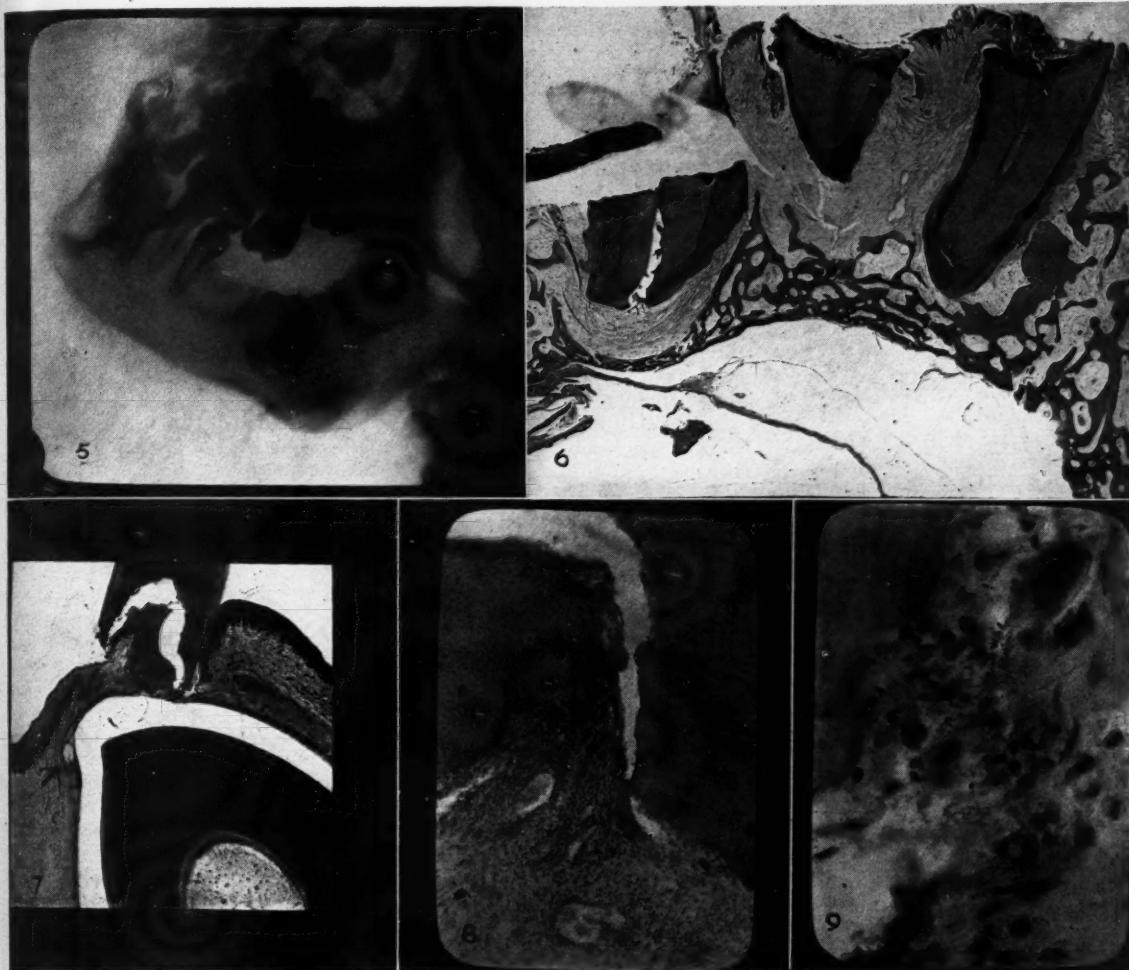


Fig. 5—Same case as shown in Fig. 4. Note complete repair, disappearance of rarefied area about molar, and repair of the lower border of the mandible. The important point is not to place too much stress on the mechanics of surgery and too little stress on biologic reparative processes.

Fig. 6—Microscopic section through what would appear in a roentgenogram as an area of rarefaction, usually designated as a chronic alveolar abscess. (Courtesy of Doctor E. H. Hatton, Northwestern University.)

Instead of an abscess cavity there is evidence of chronic inflammation. Resorption of the cancellous bone supporting the tooth, and this area of bone destruction filled in with granulation and fibrous tissue. Note new deposits of cementum about the root ends as further evidence of chronic inflammation. Whereas such an area is not a chronic alveolar abscess, it undoubtedly is a residual area of infection and may constitute a primary focus of infection.

Fig. 7—Deciduous tooth in a dog. Note break in mouth epithelium with a sinus leading down to a small abscess above the tooth sac of the permanent tooth. Small abscess, indicated by arrow. (Courtesy of Doctor W. G. Skillen, Northwestern University.)

Fig. 8—Higher magnification of break in mouth epithelium with the tooth structure opening up the deeper tissues to bacterial flora of the mouth. (Courtesy of Doctor W. G. Skillen, Northwestern University.)

Fig. 9—Still higher magnification of the deep tissues infiltrated with micro-organisms. (Courtesy of Doctor W. G. Skillen, Northwestern University.)

Any break in the mouth epithelium may constitute a primary focus of infection.

tissues, setting up diseased conditions in more remote parts.

"It has been assumed that focal infection, due to micro-organisms which produce endotoxins, may cause systemic disturbances by dissemination of toxic substances from the focus." Billings made this statement in the knowledge that it was a hypothetical concept. With our present technique or knowledge, endotoxins cannot be isolated from a secondary source of disease; by their very nature, they must be unidentified chemical entities. The second concept set up by Billings was that the micro-

organisms themselves were disseminated from the primary source by way of the blood stream or lymph channels to the site of the disease process. This concept, of course, was susceptible of laboratory demonstration, because micro-organisms can be identified both by their forms and their chemical reaction on culture media.

Doctor Rosenow, collaborating with Doctor Billings, experimented a great deal in isolating bacteria from primary foci, growing them in culture media, and then injecting these cultures directly in the blood stream of laboratory animals.

Dentists have neither the time nor the facilities to carry on an extensive laboratory demonstration of the organisms found within or about, pulpless teeth. Dentists should, however, be capable of critically evaluating the results of the research work of others in so far as their conclusions are applicable to dental clinical problems. It is necessary to distinguish between those conclusions which are purely hypothetical and those which rest on a factual basis. This means the evaluating of evidence.

In a critical review of focal infection in which he reviewed

Rosenow's work, Holman² says.

The number of bacteria injected varied greatly. In the paper on elective localization, the doses given are—for rabbits from 7.5 to 45 cc., and for dogs from 15 to 75 cc. However, although Rosenow stated that the number of lesions in muscles was in proportion to the size of the dose injected, one finds in his articles on rheumatism the description of a rabbit that received 75 cc. and a dog 240 cc. In the paper on ulcer of the stomach, a dog was given 300 cc.; in the report on erythema nodosum, a dog was given 150 cc., and in the report on herpes-zoster, a rabbit was given 60 cc. and dogs 90 cc.; also much smaller doses than those included as the minimum were often used.

I do not wish to appear critical of the technique used in this work, but if I must evaluate pulpless teeth clinically, I must feel that the evidence presented from laboratory or clinic on the concept of focal infection is of such a nature as to justify extraction of questionable teeth. I am not a bacteriologist, and do not know the number of bacteria contained in such injections, but I do feel sure they must total many millions. I wonder whether millions of organisms, varying in their virulence, thrown directly into the blood stream reproduce the biologic process by which bacteria are disseminated from a focus to the general body system.

I treat from 150 to 200 severe, acute infections about the mouth at the Cook County Hospital annually. The infections usually arise in association with an infected tooth. The patient presents a severe cellulitis with fever varying from 100° to 103° F., and appears acutely ill. My treatment consists of hospitalization, copious fluids, and the stimulation of the local inflammatory process by roentgen ray therapy, hot fomentations, and a therapeutic lamp. This treatment is pursued until the infective process is well localized with abscess formation. The abscess is incised and drained, in anticipation of its spontaneous rupture. The recovery is usually uneventful. In the treatment of these infections we depend on natural immunization and localization.

Of 400 of these infections sufficiently severe to hospitalize the patients the mortality rate was 2.5 per cent. What would have happened to these patients if the contents of these abscessed cavities had been directly injected into the vascular system? I am sure that the mortality rate from a generalized septicemia would have been high.

A great deal of bacteriologic research has been done on pulpless teeth. The methods have been both qualitative and quantitative. If we

are to accept the fundamental concept that a focus of infection is a circumscribed area of tissue containing pathogenic bacteria, it becomes important in the problem of tooth removal to know what percentage of these pulpless teeth contain, either within themselves or in their periapical tissues, pathogenic micro-organisms.

The quantitative method that Hayden and Rhoads used as the basis of their investigation rests on the attempt to remove the questionable tooth to be cultured without contamination with the bacteria contained in the mouth cavity. I have extracted teeth for Rhoads, attempting to maintain aseptic conditions by sterilization of the mucous membrane with iodine, packing the mouth cavity with sterile gauze, and removing the tooth without letting it touch anything in the mouth. The fallacy of this method lies in the fact that one cannot sterilize mucous membrane, and, even if one could, every dentist knows that there still remains the gingival crevice which no doubt contains bacteria and which could not be reached by the iodine application.

To offset this serious criticism of the technique involved, these workers have used vital teeth extracted in the same manner as controls. The apex of the tooth removed is amputated with sterile cutting forceps, dropped into sterile culture mediums, and then transferred on agar plates. In exactly forty-eight hours the colonies growing on the cultured agar plates are then counted and the number of bacteria estimated. In a preliminary report which Rhoads gave me the counts were as follows: vital teeth, 1,000; pulpless teeth, from 2,000 to 1,000,000.

The reasoning here is that when the counts of the vital teeth remain consistently low, and the counts of the pulpless teeth are high, the high counts represent bacteria found at the apices of the teeth and cannot be explained on the basis of contamination. Rhoads and Dick³ have given the average count of bacteria obtained from the apices of pulpless teeth as 759,574 and of the healthy controls 1,876. Of the twenty-nine pulpless teeth examined 51.7 per cent gave this higher bacterial count.

Hatton,⁴ directing a similar type of investigation on pulpless teeth, had the tooth extracted in the same manner as Rhoads, but in addition dipped the extracted tooth in alcohol and burned off the alcohol. The roots

were then amputated with sterile forceps and the contents of the root canal cultured. This technique ruled out any criticism of contamination; hence their figures are qualitative. Forty-eight cases were studied in this way, and out of these, bacteria were not recovered in fifteen instances. In seven of the latter the clinical diagnosis was that of a devitalized pulp; six contained root fillings and two had vital pulps. The percentage of pulpless teeth containing bacteria was 68, and if we excluded two vital pulps, the percentage, of course, would be higher.

At least we can come to the conclusion from these studies that pulpless teeth contain pathogenic bacteria, varying from 51.7 to 68 per cent of the cases, and definitely fall within Billings' original definition that they constitute foci of infection. The mere finding of pathogenic bacteria either at the apices of pulpless teeth or in their root canals does not constitute proof that these foci are disseminating micro-organisms to remote tissues of the body. Too often have we dentists advised the removal of pulpless teeth without any apparent effect on the systemic disease, so that dentists like physicians have searched for further corroborative evidence to support the conclusion that the dental foci are producing a focal infection.

Holman,² in a comprehensive review of the medical literature, reveals that investigators working on this problem have also searched for evidence of focal infection other than the mere finding of a focus. If the bacteria are carried from the primary site to more remote tissues, then they must often go by way of the blood stream, and in a case of frank focal infection, they should be found in the blood stream by blood cultures. But, as Holman states, the blood cultures are so often negative.

Skin tests have been used to test the patient's sensitivity to isolated bacteria. High uric acid content of the blood indicates nuclear degeneration, which in turn may mean the presence of focal infection when other well known factors have been ruled out. De Niord states that the elimination of all foci of infection is followed invariably by a return to normal of the uric acid index of the blood.

Holman reports, "I have not seen confirmation of these results." Deland and Price⁵ attempted to show a relationship between lymphocytosis and focal infection, experimenting with the periapical infection about the teeth. But, as Holman states, this work has been of no value in the

²Rhoads, P. S. and Dick, G. F.: Pulpless Teeth, *J. A. D. A.* 19:1884-1893 (November) 1932.

³Hasegawa, K.: Bacteriological Study of Root Canals of Infected Pulps, Abstract of Master's Thesis, Northwestern University Dental School, Chicago, June 18, 1928, under the direction of Doctor Hatton.

⁴Holman, W. L.: Focal Infection and Elective Localization, *Arch. Path.* 5:68-77 (January) 1928.

⁵Price, W. A.: Some Systemic Expressions of Dental Infections, *Ann. Clin. Med.* 4:943, 1926. Deland, J.: Lymphocytosis as Diagnostic Sign of Chronic Periapical Dental Infection in Adults, *J. A. M. A.* 77:1308 (October 22) 1921.

hands of others. I quote these statements to show how controversial are the facts brought forth to support these various hypotheses.

FOCAL INFECTION AND ROENTGENOLOGY

The dentist, in appraising dental foci of infection, resorts to roentgenographic examination as well as direct inspection. Usually pulpless teeth even though they present large areas of bone destruction about their apexes are quiescent and reveal no striking local physical condition unless they become involved in an acute process.

The so-called rarefied areas are often designated as chronic alveolar abscesses. If we take the clinical concept of an abscess, we know it to be a circumscribed cavity either in hard or soft tissue containing pus demonstrable to the naked eye. If the abscess is chronic in character, we then usually find a discharging fistula leading from the surface to the site of the lesion. Certainly these rarefied areas in the bone about pulpless teeth are not abscesses in this clinical sense. To me the entire thinking on this problem does not fit the clinical observations. So often a patient presents teeth for extraction which he or she has been told have pus pockets at their apexes. One then extracts a tooth and the patient's query is, "Doctor where is the pus?" Of course, there is no pus present, and when one carefully examines the apex of the tooth all that one can note is evidence of erosion. The root apex is often rough and denuded. These areas are evidence to me of an inflammatory process in the bone, with subsequent breaking down of the osseous intracancellous structure which involves a removal of the calcific content by a process of absorption. As evidence that this destructive lesion has an inflammatory basis, we know that similar areas of bone rarefaction can be produced at the apex of the tooth if the tooth is subjected to unusual trauma, such as results from a high restoration.

Coolidge⁸ working on dogs, removed pulps under aseptic conditions and found evidence of periapical bone destruction on microscopic examination. He had sealed into these root canals nothing more irritating than oil of cloves. We can conclude that any mechanical, physical, or chemical agent may produce the so-called areas of rarefaction about the apex of a tooth. And yet the majority of dentists will take these areas of rarefaction as conclusive evidence of foci of infection, and if no areas present themselves, although there are a num-

ber of pulpless teeth which are roentgenographically normal, the patient is told that the mouth is free of foci. This conclusion is fallacious. Price believes that extensive zones of rarefaction in dental infection in non-susceptible persons indicate high resistance.

We find these areas of rarefaction, then, interpreted, on the one hand, as large chronic alveolar abscesses, and, on the other, as indicating a high degree of resistance in non-susceptible persons. Just what positive criteria we are to use to determine the susceptible from the non-susceptible, I am at a loss to say.

If we are to base our conclusions on bacterial rather than on roentgenographic evidence, then we must keep in mind that the bacteriologic observations of pulpless teeth, as carried out by competent research workers, is important. Holman² quotes the work of Hayden as follows: "Of 1,500 teeth he found that of those giving a positive culture and also positive roentgenographic evidence suggesting infection, 4.8% were vital and 62.8% were pulpless, while 46.2% of the pulpless teeth with negative roentgenographic evidence gave positive cultures."

If these percentages of bacterial observations represent a fair picture of roentgenographically normal pulpless teeth, the dentist who considers all roentgenographically normal teeth as healthy is not being critical in the light of these bacterial observations, and the same criticism can be made of the dentist who believes in 100 per cent extraction of all pulpless teeth.

NECESSITY OF COOPERATION BETWEEN PHYSICIAN AND DENTIST

What should be the dentist's attitude in view of the mass of evidence that has accumulated on this controversial problem of focal infection?

Holman,² after an exhaustive review of the experiments which have been conducted comes to this conclusion:

The most convincing evidence of such relationship (that is, between the focus and the focal infection), however, has been pragmatic. When the apparent focus of infection has been removed, there may be an exacerbation of the secondary focus at the time of operation (tonsillectomy, extraction of teeth, et al.), or cure of the clinical condition may follow. This is the criterion on which the principle of focal infection is mainly founded.

To me the sensible attitude in dealing with the problem of focal infection of dental origin calls for intelligent cooperation between the dentist and the physician. Doctor McNealy of Chicago, talking to a group of den-

tists in the postgraduate course at the Cook County Hospital said:

Usually in this problem the dentist has performed the dental work for the patient and he resents the inference of the medical man that his work is defective. Instead of cooperation there is antagonism, and the patient is then caught between the upper and nether millstone and is the one who is being harmed. Instead of intelligent cooperative study of his case, he meets with a divergence of opinion on the part of the physician and the dentist.

Why should there be cooperation in this problem of dental foci between the physician and the dentist? Because it is a joint problem. I have yet to find the average medical practitioner who can intelligently interpret dental roentgenograms. He is often at a loss to determine which teeth are vital and which are pulpless. Many times have I heard dentists voice resentment against the average physician who has referred his patient back to him with the advice to extract certain teeth, the dentist being positive that these teeth are vital, with no evidence either by way of inspection, digital examination, or roentgenographic examination that they could be possible foci of infection.

When the medical and dental schools establish a joint clinic where both the dental and medical students may be brought together, and where intelligent interpretation of the mutual relationship of this problem is discussed, then we shall have arrived at a satisfactory basis for future cooperation between the physician and the dentist.

The mouth ordinarily presents two types of foci, the so-called pulpless tooth and the pyorrheal pocket. Gottlieb thinks he has demonstrated that normally there is no such anatomic entity as the gingival crevice; that an epithelial cuticle bridges across, from the enamel of the tooth to the epithelium of the gingivae. In reality, this is early destroyed and there is a gingival crevice. In the healthy mouth the epithelium of the gingivae, however, is in close contact with the tooth. Let an injury occur here, a break in the epithelium, and there is a direct pathway for the invasion of the deeper tissues by micro-organisms. The pyorrheal pocket, then, is a definite break in the oral epithelium and may constitute a primary focus.

If the decision has been reached by the physician and the dentist that in a given patient, who is suffering from a systemic disease attributed to a focal infection, all suggestive foci are to be eliminated, particularly the pulpless teeth, what should be the surgical procedure? Extraction, extraction and curettage, or, as has been suggested, removal of the cor-

⁸Personal communication to the author.

tical plate of bone with excision of the bony tissue involved?

Hugh MacMillan in talking about dental extractions says:

Of all surgical procedures the extraction of a tooth is universally successful, although we operate in a contaminated field and often the tooth itself is infected. After the tooth is extracted there is free bleeding from the alveolus, then a blood clot forms in the tooth socket, later the clot sloughs out, and a wide, open drainage tube remains.

It is this open drainage together with the defensive and reparative biologic processes that follow which are the essential factors in the eradication of the foci. I see no objection to the gentle teasing out of any granulation tissue present as is so often found when the roentgenogram reveals a definite area of bone destruction; but to break down the adjacent cancellous bone, opening up new areas for the dissemination of any bacteria present, is not good surgical procedure.

The school of dentists who have advocated the raising of a flap, the trimming away of cortical bone, and then the dissecting out of the infected area, are in the same position as I would be after having drained a large abscess cavity in the submaxillary triangle following a severe tooth infection, if I were then to proceed to dissect out the abscess cavity. Anyone who treats severe infection realizes that the minimum of mechanical intervention in any infected area is advisable. In emphasizing that mechanical intervention should be held to a minimum, I do not wish to underestimate biologic defensive and reparative mechanisms. The same surgical principles are applicable in dealing with infectious processes

about the mouth as are applicable in general surgery.

CONCLUSIONS

The problem of pulpless teeth in their relation to systemic complaints is a difficult one on which to give a satisfactory opinion. The difficulty lies in the fact that the chain of evidence necessary to prove that any particular tooth is the causative factor of the complaint is incomplete.

Roentgenographic evidence obviously has little value beyond the fact that one can pick out the pulpless teeth and detect any periapical bone changes which suggest a chronic infective process.

The reason that roentgenographic evidence is incomplete lies in the fact that it is a physical method of registering different degrees of radiolucency or radiopacity, but does not register the presence of bacteria. To prove the presence of bacteria requires that the tooth suggestive of infection be removed and examined bacteriologically.

There is strong probability that streptococci or other organisms are present about pulpless teeth. Almost all pulpless teeth must be regarded as probable harbingers of bacteria capable of producing disease processes. But, even this fact that pulpless teeth, in a large percentage of cases, do carry pathologic bacteria does not prove that in any particular case the bacteria are producing systemic infection.

We are forced, then, to conclude that in any particular case in which a persistent systemic complaint is present which may be attributed to

a focal infection, all possible foci must be eradicated. When this conclusion is reached and questionable teeth have been removed, the most the patient can be promised is that the mouth has been ruled out as a factor in the systemic complaint. To attempt, in the face of this problem, to select any single tooth as the one causative agent is futile. Only a total eradication of all pulpless teeth eliminates the mouth as the source of any foci of infection.

Because the patient may not obtain relief after the removal of pulpless teeth, one hesitates to give positive advice. Occasionally patients are benefited by the removal of pulpless teeth, however, and this fact must be taken into account in arriving at a decision.

In a recent authoritative paper on focal infection there appears the statement that, "The proof of a focus is pragmatic—occasionally we remove something and the patient gets better, or when the local focus has been disturbed there is an exacerbation of the systemic complaint which is taken to mean that there was a direct relation between the two factors."

If the patient's physician believes that the systemic complaint is due to a foci of infection, then the dentist can rule out the mouth as a source of focal infection only by having removed all pulpless teeth with the eradication of all pyorrheal pockets. If he does not feel that he is justified in this radical procedure, he can rest on the assumption that teeth which appear normal in the roentgenograms are not active sites of dissemination of bacteria; the final decision to extract these teeth then rests on the internist.

55 East Washington Street.

TO THE EDITOR

ANOTHER USE FOR SODIUM PERBORATE

A simple, effective means of removing iodine stains from the mucous membrane of the mouth, skin, and fingernails is by

the use of sodium perborate in water. The removal of iodine stains from linens without altering their texture is also made possible with this sodium perborate solution.

For the removal of tissue stains, the stained area is bathed with an aqueous

solution of sodium perborate. The stain will disappear immediately without smarting.

In the case of iodine-stained linens, the material is immersed in the sodium perborate solution. The stain will be found to disappear quickly.

—I. M. HUGEL, D.D.S., New York.

The Editor's Page

A DISCUSSION of the values and dangers of sunlight may not at first seem to be appropriate in a dental journal. The fact is that sunlight has been given a great deal of credit as an unusual force in mobilizing calcium and phosphorus and in the formation of vitamin D in the skin. Anything that will favorably influence calcium-phosphorus metabolism is supposed to have a beneficial effect on the human dentition. It is altogether likely, then, that dentists suggest to some of their patients the value of exposing themselves to the sun's rays in order to secure these results.

Sun bathing seems to be partly a fad and partly a therapeutic method. In either case it is a practice that can be extremely harmful. In a recent article, Laurens¹ says, Ultraviolet rays (shorter than 313 millimicrons) are specific in the cure and prevention of rickets (infantile and adult) and of infantile tetany. Cases of extrapulmonary tuberculosis, including lupus vulgaris as a skin disease, are markedly benefited by careful exposure to sunlight or to the closest approximation to natural sunlight; viz., the energy emitted by a flaming carbon arc lamp. The benefits are due not solely to ultraviolet rays with its specific in rickets, but as well to the light or luminous rays, to the heat or infra-red rays which are so preponderantly present in natural sunshine and carbon arc radiation . . . natural sunlight will hasten the healing of sluggish, indolent wounds . . . [but] the surface action of ultraviolet wavelengths shorter than 315 millimicrons in large quantity is detrimental to the healing of wounds . . .

Lowman² points out that, For the clinical use of insulation, we apply the principle of the action of heating the surface of the body to draw the blood away from the deeper areas. Hence, the proper use of sun bathing is of benefit in treating colds, arthritis, muscle pain and soreness, so-called lumbago or myalgia, non-tubercular chest infections, bronchitis.

Except for the conditions cited there has been no scientific evidence presented to assure us of the value of sunlight. Exposure of the body surface produces an increase in the metabolic rate and an increase in the energy output, so that certain physical types might be definitely harmed by overexposure.

Laurens cites the studies of Ellinger on the ultraviolet erythema reaction. He reports great variability in the sensitivity of different individuals. Blondes (40-170 per cent) are much more

sensitive than brunettes, and women are less sensitive (20 per cent) than men. All persons under 20 and over 50 have a lowered sensitivity. There is a maximum sensitivity in March and April and again in October and November. Persons with an unstable nervous system, an overactive thyroid gland, or with high blood pressure or active tuberculosis also show a quite high sensitivity.

In a warning to American physicians a recent editorial³ emphasizes the harmful effects of overexposure to sunlight. These effects are (1) photosensitization, whereby the subject may experience severe reactions on subsequent exposure to sunlight; (2) the production of certain types of skin disease; (3) actual injury to the central nervous system as a result of heating of the skull.

Lowman in his article directed to an entirely different group concurs in the opinions expressed by Laurens that "While the use of sun treatment is of undoubted therapeutic value, its use is fraught with danger if given without due knowledge and caution." Lowman also indicates the symptoms of overexposure:

1. Local: redness appearing or persisting more than four hours after treatment; sensation of heat or burning in exposed skin; or blistering.

2. Focal symptoms: aggravation of any symptoms at a given site of disease; increased expectoration; increased soreness of joint; increased discharge of wound or sinus; any increase of pain or discomfort.

3. General symptoms: decidedly increased pulse and temperature; or slightly increased, persisting for more than two hours after exposure; feelings of fatigue, lassitude, exhaustion, dizziness, insomnia, nausea, or loss of appetite.

Although comparatively few dentists may advise exposure to the sun's rays as a method of improving the calcium-phosphorus metabolism, all dentists do have the opportunity of distributing fundamental information on this subject to their friends and patients. At this time of the year we observe many patients in our practices with burns and blisters and definite general signs of disturbances from overexposure. They should be told something of the values and dangers of the sun's rays. Once again, we can exert an important public health function in teaching elementary facts of hygiene.

¹Laurens, Henry: Sunlight and Health, *Scientific Monthly*, 42: 312 (April) 1936.

²Lowman, C. L.: The Value and Dangers of Sunlight, *Beach & Pool*, 10:14 (May) 1936.

³Sunlight and Health, Editorials, *J. A. M. A.* 106:2071 (June 13) 1936.

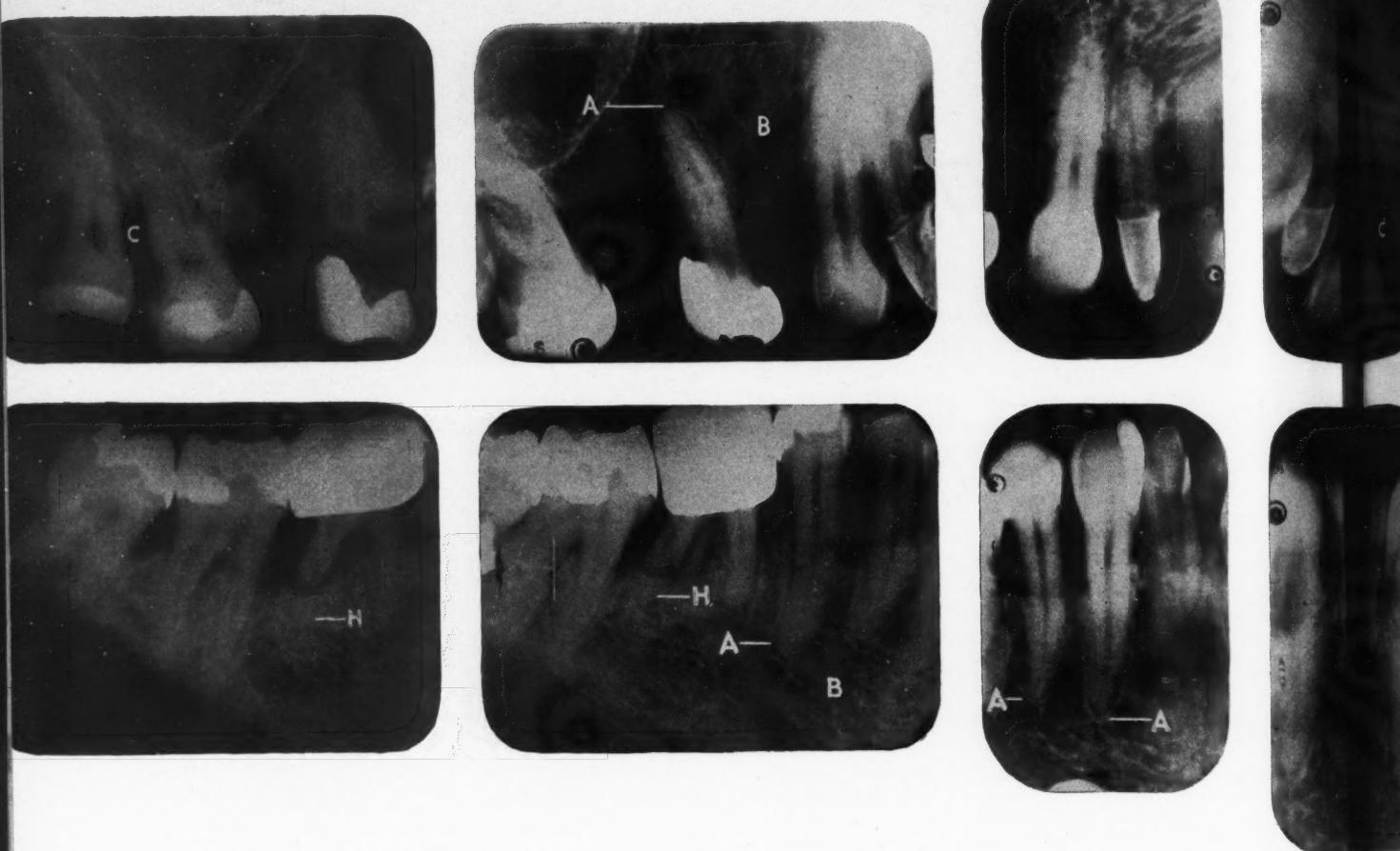


Fig. 1—Diffuse atrophy in periodontitis complex in patient, aged 30. Note, A, the thickening of the lamina dura upper left second bicuspid, upper right cuspid, upper right second bicuspid, and the upper right first molar, and about the apexes of all the lower teeth. Observe, B, the wide medullary spaces and thinning out of the trabeculae (about the apexes of the lower left cuspid and bicuspids); C, Deep pocket formation and drifting of teeth between the left upper molars, between upper lateral and central incisors, at upper right cuspid, and upper molars, also about the roots of all the lower teeth. D, Vertical pocket formation in lower central area; compare with Fig. 2. E, Nutritional canals. F, Artefact in lower right molar area. G, Note the poor bone regeneration characterized by wide medullary spaces in the alveolar bone in the lower right first molar area where the tooth was extracted; also in the bone mesial and distal to the right upper second bicuspid, as well as the area distal to the right upper cuspid. H, Note apical resorption of distal root of lower left first molar owing to periodontal infection.

ETIOLOGY

THE etiology of periodontal disease in some of its phases is unknown. Many theories have been advanced, such as the eating of soft pasty foods, improper diets, and racial heredity. Systemic disease undoubtedly serves as a predisposing cause in many cases of periodontal disease. More specifically, we have three working theories. First, that periodontal disease is due to local causes; second, that it is due to constitutional causes; and third, that it is due to a combination of both local and systemic causes.

Calculus used to be considered the main cause which paved the way for organisms that alone produced the disease. During the last fifteen years schools have arisen which stress function, traumatic occlusion, and atrophic bone changes. Our conception of periodontal disease has undergone

radical changes since Black¹ described pyorrhea as a disease characterized by the roots of teeth soaked in pus.

Gottlieb² of Vienna believes that periodontal disease is due to diffuse atrophic changes in the bone. He states that pyorrhea is the result of bone that has developed so poorly as to be unable to withstand the forces of mastication. Moreover, he believes that as teeth wear from mastication, they continue to erupt in order to maintain occlusion. This continuous eruption of the teeth from their sockets accounts for the gingival recession.

In contrast to Gottlieb, Hartzell³ believes that pyorrhea is a local disease, the result of bacteria entering

¹Black, G. V.: American System of Dentistry, 1886.

²Gottlieb, B.: Tissue Changes in Pyorrhea, J. A. D. A. 14:2178 (December) 1927.

³Hartzell, T. B.: Important Factors in the Etiology and Control of Periodontoclasia, J. A. D. A. 14:899 (May) 1927.

ATROPHIC CHANGES IN

JOHN M.D.

the gum crevices. The bacteria set up an infection that results in periodontal disease. He believes that all periodontal diseases can be prevented by keeping the teeth and gingivae free from bacterial invasion. Many years of study have strengthened his belief in this theory.

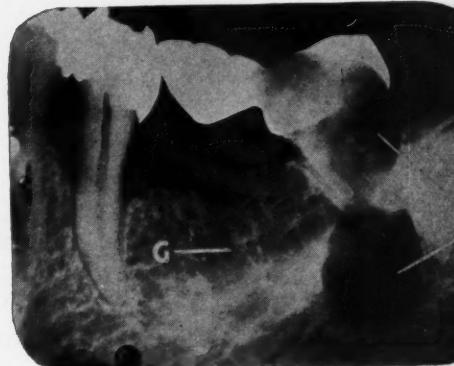
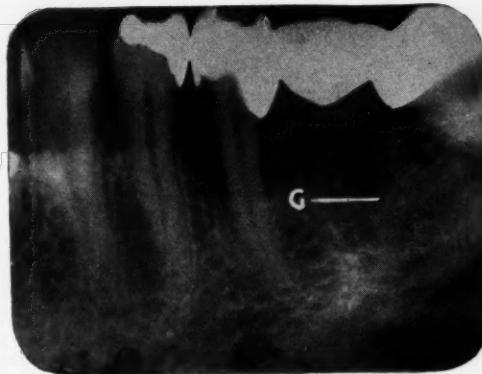
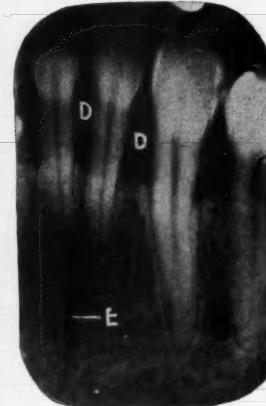
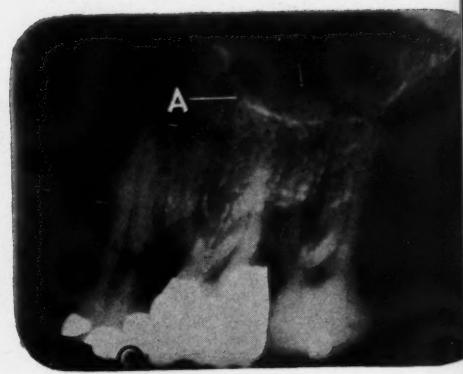
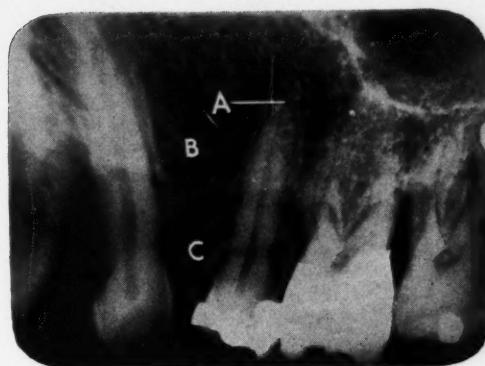
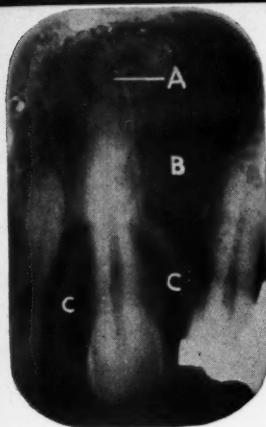
Leonard⁴ stresses systemic changes. Howe⁵ and Price⁶ believe periodontal disease to be due to dietary deficiencies. Stillman and McCall⁷

⁴Leonard, H. J.: Periodontoclasia: Cause and Treatment, J. A. D. A. 16:629-635 (April) 1929; (A Symposium) Indiana S. D. A. 8:10-16 (October) 1929.

⁵Howe, P. R.: Pyorrhea Alveolaris, Facts Versus Theory, Pacific D. Gaz. 23:95 (February) 1915; Pyorrhea, J. A. D. A. 7:491 (May) 1920; The Focal Theory of Infection in Its Application to the Teeth, *ibid.* page 635; Treatment of Pulpless Teeth, *ibid.* page 853.

⁶Price, W. A.: Dental Infection, Oral and Systemic, Cleveland, Penton Pub. Company, 1923, page 92.

⁷Stillman, P. R. and McCall, J. O.: Periodontoclasia—Etiology, Diagnosis, and Treatment, J. D. Res. 3:73 (March) 1921.



ODONTOLOGIC DIAGNOSIS

H. D. M.D.

Fig. 2—Compare the roentgenographic evidence (Fig. 1) with the clinical appearance of the gingivae which show only slight evidence of recession.



have stressed traumagenic occlusion, whereas Merritt⁸ and Kronfeld⁹ emphasize atrophic bone changes. Thus the theories accumulate. I say this with a sense of respect for these pioneers who have contributed so much to the sum total of our knowledge of periodontal diseases. Each one is probably correct in his theory, for it is generally accepted that periodontal disease is the result of several factors. They all bear a close relationship to the development of diseases affecting the periodontal tissues.

THEORY OF ATROPHIC CHANGES IN BONE

There are certain types of diffuse atrophy usually in young persons

with caries-free teeth, in which there is a gradual recession of the periodontal tissues, unaccompanied by pus or inflammatory changes. There is drifting and displacement of the teeth and progressive destruction of the underlying bone with the formation of periodontal pockets. These atrophic changes cannot even withstand normal stress and the condition is general throughout the mouth. It bears no relation to traumagenic occlusion and is the same buccally as lingually. The breaking-down process of tissue occurs at a more rapid rate than repair. The etiology is unknown and all present theories, dietary or glandular deficiency or infection, are inadequate. Because we do not know the etiology, we cannot treat the disease successfully except by palliative treatment. This is the type of periodontal case that is some-

times classified as the complex or vertical type. The patient should be told that the prognosis is unfavorable.

It is important for the dentist to consider these atrophic changes when offering a diagnosis and prognosis, and in explaining his method of treatment.

LIMITATION OF TREATMENT

In dental practice we are often confronted with a patient who has to lose all the upper and the lower posterior teeth. We strive to preserve the six lower anterior teeth. From the periodontist's point of view, how can we be certain that the atrophic changes which resulted in the loss of the other teeth will not shortly result in the loss of these six remaining teeth, notwithstanding our best efforts in treatment, whether the treatment is conservative scaling or

⁸Merritt, A. H.: *Periodontal Diseases, Diagnosis and Treatment*, New York, The MacMillan Company, 1930, page 32.

⁹Kronfeld, Rudolf: *Histopathology of the Teeth*, Philadelphia, Lea & Febiger, 1933, page 297.

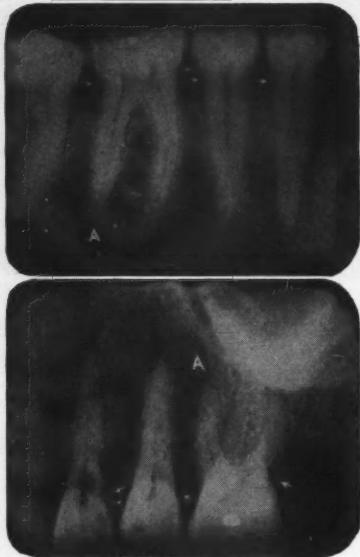


Fig. 3—Simplex periodontitis in patient, aged 50. Representative of all other teeth in the mouth. Note how the lamina dura follows the tooth in a normal relation about the apex. Observe the fine closely knitted trabeculae forming a network of criss-cross bone cells. The alveolar ridge is evenly resorbed throughout the mouth. Note the calculus deposits about the root surfaces. Also note the smooth even wearing of the occlusal surfaces of the enamel. This patient has recently been referred for periodontal treatment. Three years ago she was told by her dentist that she had pyorrhea and that it was incurable; therefore she should have all her teeth extracted. Clinically the gingivae were puffed and hypertrophied, purplish, and free pus exuded from all the pockets. This type of case responds readily to treatment. A, Compare the clinical and roentgenographic evidence with Figs. 1 and 2. A, Closely knit trabeculae. Arrows point to calculus.

radical surgery? From the prosthodontist's point of view, suppose we say to our patient, "You have retained these lower six teeth long enough. Let us extract them and save the remaining alveolar bone for the better retention of a full lower denture." Suppose that the teeth are extracted, how can we control the atrophic bone changes that will continue beneath the artificial denture?

Until we have a more profound knowledge of these atrophic bone changes, we will be unable to cope with many of our dental problems, whether they are periodontal, prosthetic, or operative in scope.

TYPES OF BONE ATROPHY

There are several types of bone atrophy commonly encountered in dental practice which may be evidenced on the roentgenogram by a rarefaction and resorption of bone. Such atrophy may be diffused laterally or may occur in a circumscribed periapical area. There is a thinning

out of the trabeculae observable microscopically and in good roentgenograms. There is also increased osteoclastic activity. When bone lacks function, the bone cells atrophy and turn into connective tissue and fat cells.

In general, bone atrophy may be classified into four common types:

1. Pressure atrophy which is evidenced about root ends accompanied by growth of new tissues, usually granulomatous in type. The pressure from this new growth causes atrophy. Traumagenic atrophy is intermittent.

2. Infective bone atrophy, more of the inflammatory type, in which the bone cells are activated and atrophy is accomplished through infection. This may come about either through apical or periodontal infection or through the blood stream.

3. Chemical atrophy which is usually the result of introducing drugs through the apex in root canal treatment, or the result of using strong drugs in sockets after extraction. It may also be produced through intake of chemicals through the blood stream.

4. Disuse atrophy, which is best exemplified by those spaces from which teeth have been removed.

OTHER TYPES OF PERIODONTAL DISTURBANCES

1. *Hyperplasia*—In contrast to bone atrophy, we have hyperplasia, which is a building up of bone by a thickening of the trabeculae. It responds to various stimuli; through infection it builds up a wall to circumscribe an area, such as a granuloma; through pressure, seen commonly mesially at second molars to withstand added pressure when the first molar has been extracted; through chemical pressure, commonly seen around infected teeth in response to long-continued mild toxin.

2. *Filth Pyorrhea*—There is another type of periodontal disturbance which Gottlieb has referred to as the "Schmutz pyorrhea" or filth pyorrhea. This is the simplex or horizontal type of case characterized by the development of periodontal pockets from without inward. This occurs in unclean mouths which show evidence of lack of oral hygiene. The periodontal pockets are formed more or less uniformly by the collection of food, débris, calculus, and bacteria in the mouth and about the gingivae.

The calculus collects in the small gum crevices and forms a wedge between the teeth and the supporting soft tissues. As these deposits collect and increase, the gum crevices enlarge, and countless bacteria find

ideal incubation zones in these periodontal pockets. It is a fairly slow process and works inward from without. Roentgenographically, the tissues below the pocket seem fairly normal with a sharp point of demarcation.

Pain is rarely present, so that its absence is of no particular significance. The gums become spongy and congested, the color changes from a healthy pink to a purplish red, and it is often possible to express pus from such gums on slight pressure.

The treatment consists of removing the etiologic factors, scaling and polishing of the teeth, and instruction in the proper use of the tooth brush.

3. *"Paradental" Pyorrhea*—There is another type of periodontal case to which Gottlieb refers as "paradental" pyorrhea. Basically it is the simplex type of case which has advanced beyond the stage of simple gingivitis. This type is characterized by an irregular distribution of periodontal pockets. In some patients there will be found only one deep pocket in the entire mouth; in other mouths numerous deep pockets may be found. The depth of these pockets may vary from a few millimeters to the entire length of the root.

Such pockets are characterized by a discharge of pus, and the root surfaces are covered with a moderate amount of serum calculus. Pain is rare except when the pocket develops into a periodontal abscess.

The etiology of this type of case may be divided into local and systemic. Locally it is the result of dental neglect over a long period, which is particularly evident in the interproximal spaces. There is usually a lack of interproximal contact which is further aggravated by food packs and mechanical wedging of toothpicks. Systemically, such deep periodontal pockets are the result of diffuse bone atrophy.

The pathologic course in this type

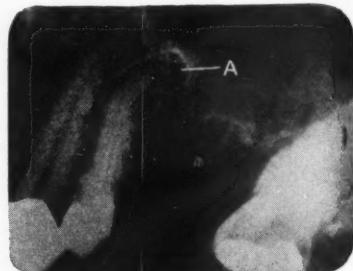


Fig. 4—Pressure atrophy. A, Atrophic changes about the apex of bicuspid accompanied by growth of new granulomatous tissue. Pressure from the new growth causes bone atrophy.



Fig. 5—Pressure atrophy. A, Atrophic changes in the area of the lower first molar as a result of pressure of cystic tissue. B, Infective bone atrophy in periapical area of pulpal origin.

of case consists of a rapid proliferation of the epithelial attachment in the direction of the apex. An extensive detachment of the periodontal tissues from one side of the root takes place. The wall of the pocket is formed by inflamed connective tissue with epithelial covering on the outer side and an ulcerated surface facing the root. This tissue Box has termed *rarefying pericementitis fibrosa*. Deeper in the socket there is

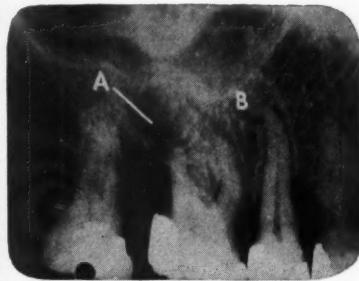


Fig. 6—A, Marginal infective atrophy in periapical area of periodontal origin. B, Normal bone.

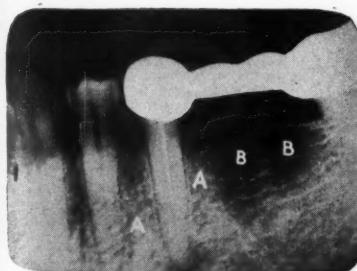


Fig. 7—Disuse atrophy. A, Normal bone. Note the density and closely knitted trabeculae. B, Bone atrophy as a result of disuse, three years after extraction. The medullary spaces are wider and the trabeculae are thinned out to a marked degree.

an inflammatory destruction of the alveolar bone around the pocket.

The treatment consists of removing the etiologic factors, scaling, curetting, and polishing of the root surfaces, relieving traumagenic forces, and instituting proper gum massage.

Besides the simplex and complex types of periodontal cases, there may be a blending of the two with characteristics of both types of cases. The description of these various types of gingivitis is difficult, as we could see the same picture from different causes, or different pictures from the same cause. However, differentiation of these types is essential in order to be able to give a prognosis and outline the treatment indicated in each type.

Diagnosis is established by clinical examination, by observation, sense of sight, smell, hearing, and manual sense, a good sense of comparison, whether in comparing one area with another or one mouth with another. By a process of deduction, we should arrive at a proper diagnosis. The past history of the patient may furnish leading information and significant facts. In the recording of facts we should study the roentgenograms, the laboratory tests, smears, and study models.

If the lamina dura follows the tooth in a fairly normal relation about the apex; if the trabeculae are close together and fairly regular, and if the spaces of extracted teeth show good bone regeneration—then, it is a simple type coming from without.

There is an absence of deep pocket formation, and resorption of the alveolar ridge is evenly distributed throughout the mouth. The occlusal

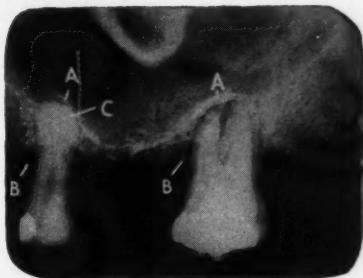


Fig. 8—Dysfunction atrophy. A, Thickening of lamina dura; B, bone atrophy due to dysfunction. During tooth movement bone is destroyed in the direction of the force and repairs distally. When the rate of repair is not equal to the rate of destruction the case is hopeless; C, hypercementosis of root.



Fig. 9A



Fig. 9B

Fig. 9—Bone regeneration. A, Resorption of alveolar process before treatment; B, After treatment. Regeneration of alveolar process and soft tissue attachments. Note regenerated level of alveolar ridge. Also note difference in the character of the bone.

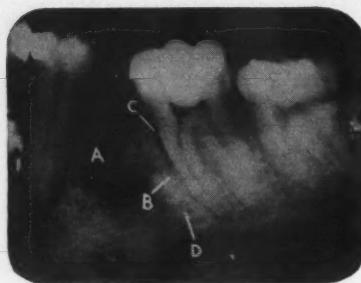


Fig. 10—Pressure atrophy to withstand added pressure seen commonly mesially at second molar when first molar has been extracted. A, Disuse atrophy; B, thickened lamina dura; C, periodontal pocket formation; beginning of atrophic bone changes; D, alveolar hyperplasia, the opposite of atrophy. Nature's effort to build up resistance to pressure stimulant from lateral stress.

enamel is likely to show signs of wear in older patients as the alveolar bone is resistant to the stresses of mastication. In the complex type of periodontitis, the enamel shows no wear as the alveolar bone is weak and atrophic changes result from the effects of occlusal stress and the forces of mastication.

If there is a thickening of the lamina dura, deep resorption of the alveolar ridge, a thinning out of the



Fig. 11—From Kronfeld: "Histopathology of the Teeth." A, Pressure atrophy; B, depth of gingival crevice of cuspid; C, normal periodontal tissues; D, depth of gingival crevice of lower right second bicuspid; E, bicuspid embedded in fibrous connective tissue. Despite the extensive loss of alveolar bone, about two thirds of the surface of the anatomic root are still in organic connection with the surrounding fibrous tissues. This illustrates the importance of clinical examination of each periodontal pocket.

trabeculae; if there are large wide medullary spaces, and the other factors point to a deeper origin or cause —then, it is a complex type coming from within.

Not so long ago it was necessary to train dentists to resort to the

roentgenogram in arriving at a diagnosis of periodontal lesions. The pendulum swung so far in that direction that we have become accustomed to depend almost entirely on the roentgenogram and not enough on our clinical examination. The two are equally important and neither can be disregarded, if we are to make an accurate diagnosis.

A periodontal pocket is determined by the amount of soft tissue attachment, not of bone. The only thing that can actually be seen in the routine roentgenogram is the amount of bone present. The belief that loss of bone and formation of a pocket must necessarily go hand in hand is not substantiated by the actual examination of the tissues involved.

CONCLUSION

It must be emphasized, therefore, that before we can treat, we must diagnose correctly, and before we can diagnose correctly, we must have a better understanding of the underlying causes with a clear and positive knowledge of the tissue changes involved. We have seen too much evidence of clinicians who arrive at theoretical and practical conclusions that are not substantiated by careful examination.

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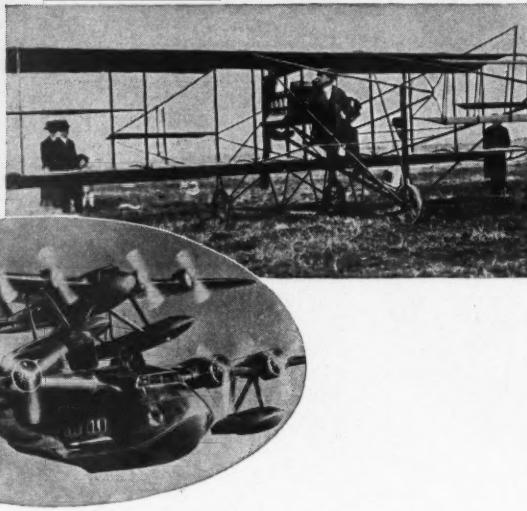
1. Go to your dentist and follow his advice. This will include the kind of toothbrush to use, and how to use it; what kind of dentifrice to use, and what kind not to use; and whether you should supplement your own home treatment with the use of dental floss and oral perborate.
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FRACTURED AND INJURED INCISORS OF CHILDHOOD

IN THE June, 1936 issue of the *International Journal of Orthodontia and Oral Surgery*, FLOYDE EDDY HOGEBOOM, D.D.S.* of Los Angeles, presents the results of an interesting survey of thirty-eight cases of injured incisors treated in his own practice.

AGE OF OCCURRENCE

Doctor Hogeboom found that most accidents to the incisors occurred between the ages of 6 and 14, with the greatest number between 8 and 10 years of age, the "toothy age," as he calls it.

Causes—The author feels that prevention of these accidents is almost impossible inasmuch as the causes are "probably closely associated with the playful age, the fact that the teeth are prominent and unsupported by a full complement of anterior teeth, and the incomplete structure of the teeth."

Types of Accidents—Fights; falls of various kinds, off bikes, on sidewalks or cement, when running, skating; bathtub; being hit with a golf stick or a broomstick; swimming; blows—these are some of the typical accidents causing fractured and injured incisors.

CLASSIFICATION

The degrees of fracture are classified in this article as first, second, and third:

First Degree Fracture—The tip is broken, and there is only a thin layer of dentin overlying the pulp to provide against thermal shock.

Second Degree Fracture—The tip is broken, and there is only a thin layer of dentin overlying the pulp with a very near exposure.

Third Degree Fracture—The pulp horns are exposed by the fracture.

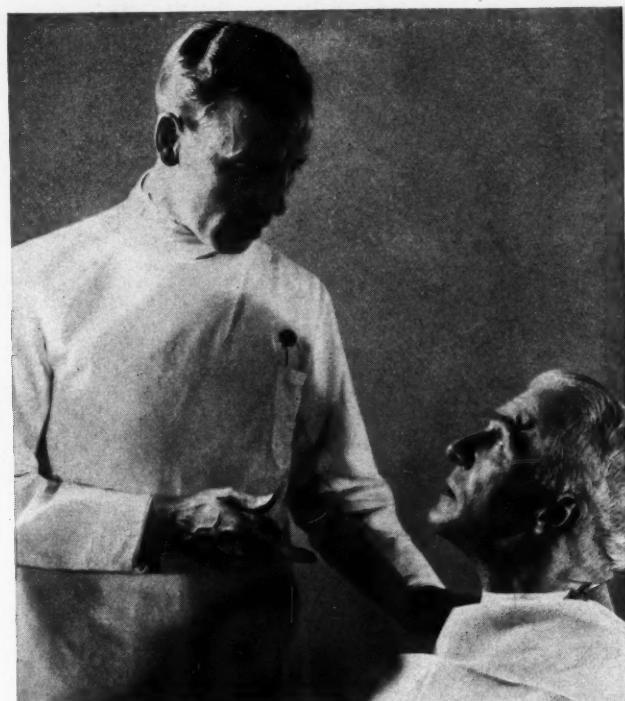
TREATMENT

Class 1—Unless the dentist is sure of a definite procedure which would help the patient, the author suggests that it might be safe advice that nothing be done. In another publication¹ Class 1 fractures are said to be "so slight that simple smoothing of the rough edges will be sufficient."

Class 2—Because the root is not completely formed and the pulp is large and "the apical foramen is a large funnel," a permanent restoration is impracticable. A protection must be constructed which will per-

*Professor of Dentistry for Children, College of Dentistry, University of Southern California.

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mit the complete development of the root of the tooth. When the horns of the pulp have sufficiently receded a permanent restoration may be placed.¹

Class 3—The technique previously described by Davis² is advised:

1. After a roentgenogram of the root is taken, the exposed pulp is removed in its entirety if the root canal is completely formed.

2. If the exposure is slight a pulp capping is indicated.

3. If the root canal is wide open and funnel-shaped, only a partial removal of the pulp is indicated.

TREATMENT IN DECIDUOUS CASES

Doctor Hogeboom describes his treatment in four cases of injury to the pulp of a deciduous central incisor in children about 3 years of age:

1. The child is held on the parent's lap.

2. The tooth is opened through the lingual surface to the canal and isolated with cotton rolls.

3. The canal is drained, and dried with paper points.

4. Formocresol is used several times and sealed in to destroy infection.

5. In three cases a mixture of zinc oxide and formocresol paste was used as a root canal filling. In one case xeroform³ paste was used.

6. A periodontal syringe with a blunt hub is filled with the xeroform paste. The hub will fit into the canal and allow the introduction of the paste.

7. Permanent cement is then placed over the root canal filling.

CONCLUSIONS

1. Because it is evidently impossible to prevent accidents to the central incisors, the dentist should be prepared with a definite technique to treat such cases.

2. Roentgenographic studies should be made at six-month intervals following treatment.

3. Treatment should be instituted as soon after the accident occurs as possible.

¹Hogeboom, F. E., and Hobbs, A. G.: Broken Incisal Tips, J. A. D. A. 20:1074 (June) 1933.

²Davis, W. C.: Dental Pulps and Pulp Canals, D. Items, Int. 45:3-12, 81-93, 245-256, 327-338, 411-416, 489-503, 569-577, 649-662, 1923.

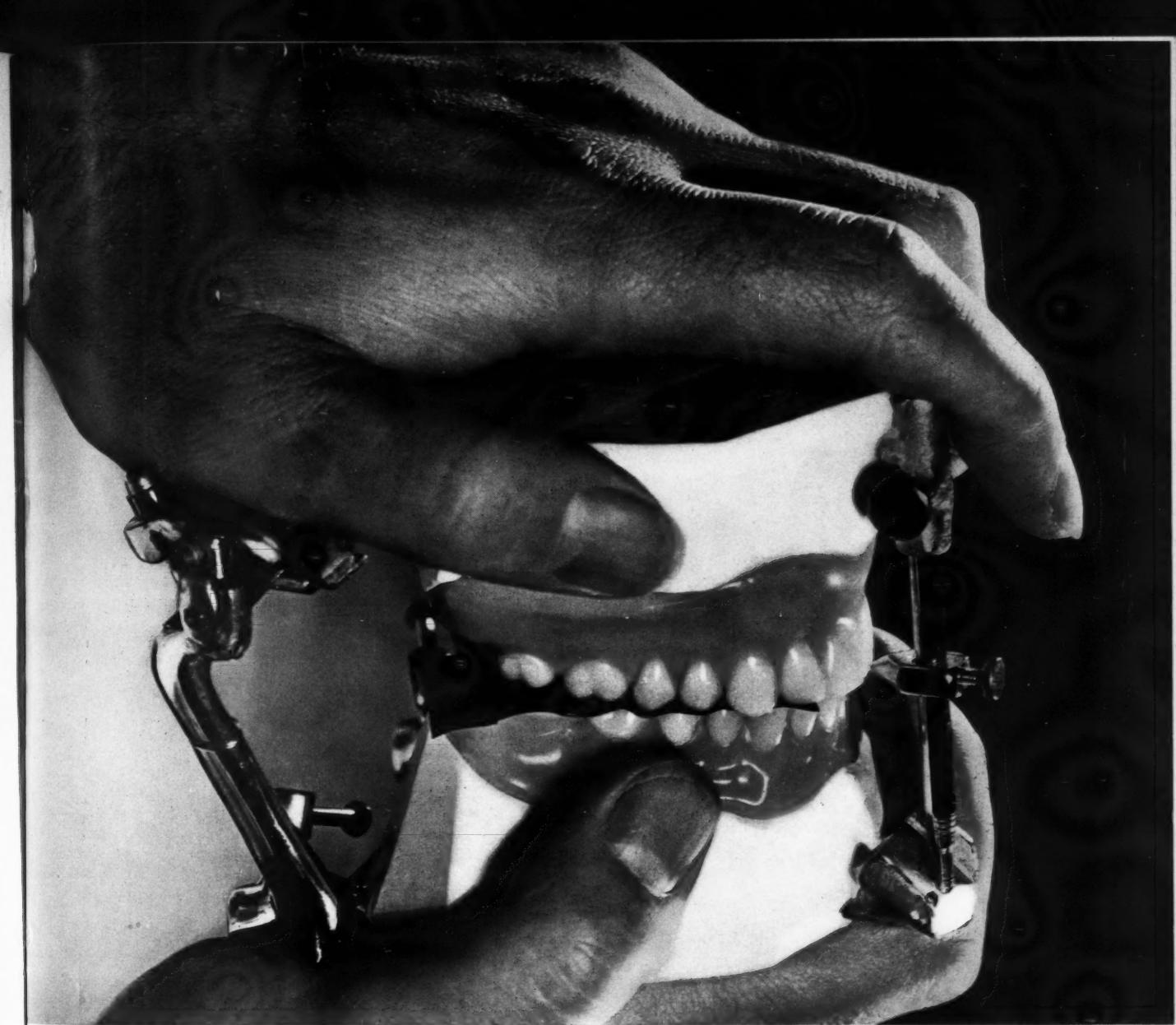
The author gives the formula for xeroform paste as follows:

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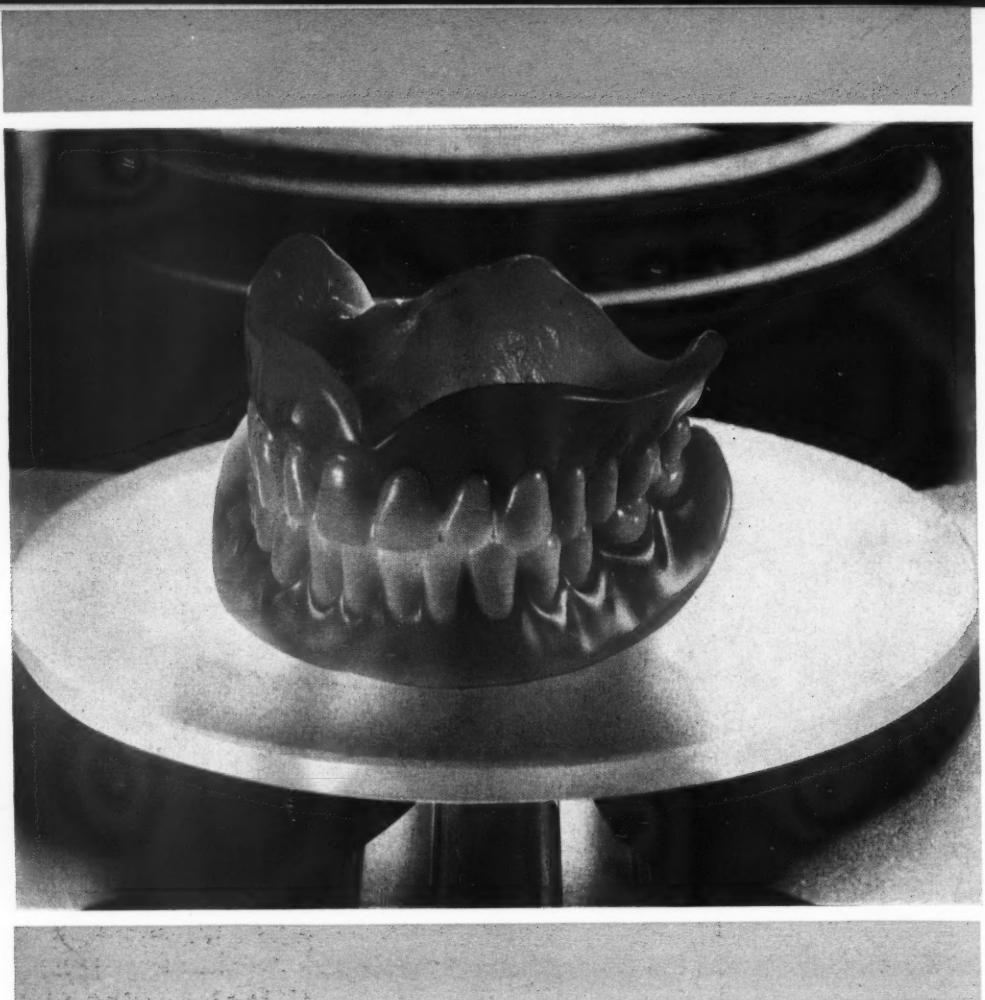
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THE PUBLISHER'S NOTEBOOK

OCCASIONALLY our front covers are devoted to publicity for dental meetings. This year, so far, some of the covers have been heralding the San Francisco meeting of the American Dental Association; the January cover advertised the Chicago Dental Society's Midwinter meeting. Last year the latter society, the First District Dental Society of New York, and the A.D.A. were given DENTAL DIGEST covers through arrangement with the publicity committees of the various organizations. One cover last year carried a map of the United States bearing legends referring to twenty-six state dental society meetings held during April and May. These special covers serve as miniature billboards and we like to believe that they help to stimulate attendance. If the magazine were a weekly, covers could be given to more societies; some of the monthly issues must necessarily be devoted to other topics.

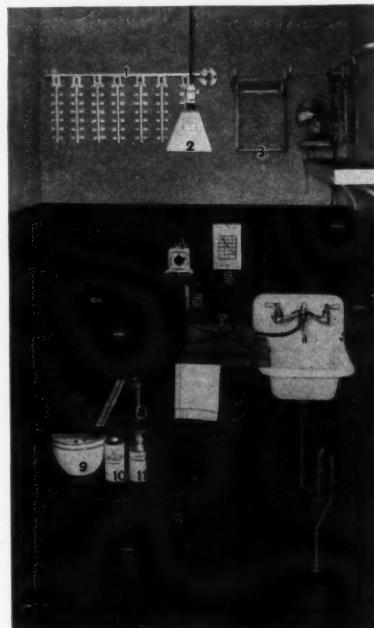
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FOR many years editors have been obliged to defend the principle that it is wrong to print editorial material that is commercially inspired—that is based entirely upon some advertiser's desire for publicity in the guise of editorial text. This principle has been defended not only by dental and medical editors but also by the editors of strictly commercial journals. Their stand has been made more difficult by less reputable editors who actually often solicit such material as a bait for paid advertising space. But now, the editors who have been resisting such demands—often antagonizing important advertisers by so doing—have won strong allies among the ad-

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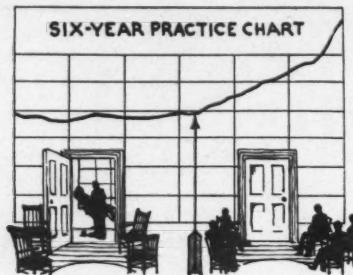
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vertisers themselves. An editorial in *Advertising Age* magazine quotes Walter A. Burke of the McCann-Erickson advertising agency as condemning the practice:

"The statement which Mr. Burke made regarding the evils of excessive publicity in the newspaper field is applicable to other classes of media as well. Short-sighted advertisers, advertising agents and publishers who permit the desire for publicity to 'dilute' the editorial columns of publications . . . are simply hastening the day when the public will rebel and refuse to give credence to anything that appears in the so-called editorial pages. . . . Even though the advertising hook is well buried in the publicity article, the intelligent reader cannot fail to get the connection and to place the proper rating on both the advertiser and the publisher."

Occasionally some manufacturer does engage in an activity that really warrants editorial mention; but, as a rule, the reputable editor is obliged to refrain from such references lest he give even the "appearance of evil." If all editors were to resist the intrusion of unwarranted material, it would be possible for any publication to print comments upon advertisers' activities when such recognition is honestly earned.

Technical journals like THE DENTAL DIGEST have a special problem. They must guard their columns vigilantly against "planted" articles submitted by unscrupulous but ostensibly ethical practitioners who have private arrangements with manufacturers. On the other hand, they are obliged occasionally to permit textual reference to specific manufactured products when clarity necessitates such specific references in describing technique. In THE DIGEST no such specific mentions are permitted if the technique may be carried out with any other product of a similar nature.

The business office of any publication is frankly commercial; but, in a spirit of enlightened self-interest, publication advertising managers support their editors' stand against printing advertising in the guise of text. Like

**"A SOLUTION OF AN
IMPORTANT PROBLEM"
OSSEOUS REAMERS**

**A Simplified and Safer Technique
for the Cutting of Bone in the
Surgical Removal of Teeth**



The Motive of the Designers of these Instruments in creating this technique is:-

First—To furnish the Profession with a method of Cutting Bone which can be acquired by the average practitioner without the aid of a costly Post-Graduate Course—

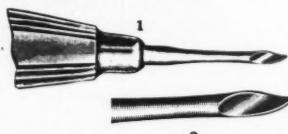
Second—To preserve Bone Structure—

Third—To sustain the Operator's Energy—

Fourth—And not least, maintain the patient's comfort.

As the Operator becomes acquainted with the instrumentation of this Technique by actual tests he will acclaim same a **DEFINITE SOLUTION** to the problem with which he was confronted in the practice of Oral Surgery and Endodontics.

There is nothing involved or complicated in the Technique. The general practitioner will experience no difficulty in handling surgery cases.



The set comprises eight instruments. Nos. 1 and 2 are large straight reamers with cutting blades in opposite directions for cutting buccally right or left or to be applied distally.



Nos. 3 and 4, same design as Nos. 1 and 2, but smaller, to prepare entry where cortical layer of bone is dense. Also efficient for removal of deeply seated apices, etc.



Nos. 5 and 6 angle permits easy access to almost any portion of upper or lower jaw. Especially adaptable when anteriors are imbedded in palate region.



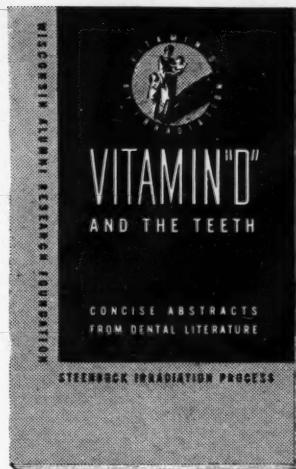
Nos. 7 and 8 emergency instruments, for cases where muscular cheeks or small mouths prevent easy access with other instruments, also where crown of third molar is vertically erupted.

Sold on thirty day trial

Return this coupon or use coupon on page 255.
The Hu-Friedy Mfg. Company,
3118 N. Rockwell St., Chicago, Ill.

() Send full information on Osseous Reamers.
() Send one set of Osseous Reamers for 30 day trial.

Dr.
Address.
City.
State.
Dealer.



New Booklet SCIENTIFIC OPINIONS ON VITAMIN D



Evaporated milk, Irradiated for Vitamin D effect, is produced by the following leading companies:

BORDEN
CARNATION
NESTLE
PET
WILSON

Under exclusive
licenses from

Prepared expressly for the dental profession, this new booklet is a concise abstract of scientific literature on the importance of Vitamin D in tooth and bone hygiene and therapy. It contains more than fifty extracts from papers by leading scientific authorities. It treats of the use of Irradiated foods and Viosterol products, as sources of Vitamin D effect for children, expectant and nursing mothers and adults generally.

This 32-page booklet, published by the Foundation, is a further element in our co-operation with the dental and medical professions. A copy will be sent free upon professional request.

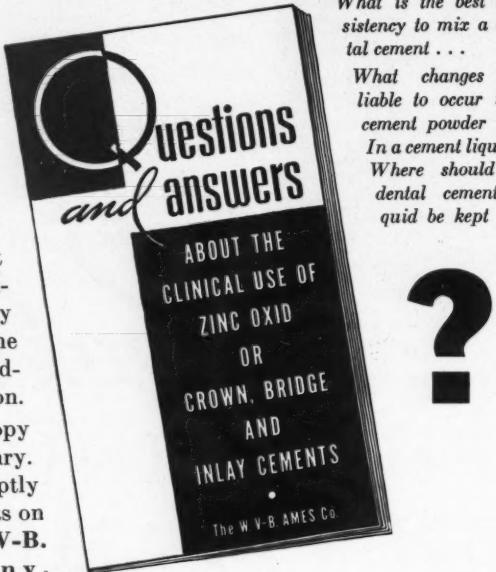
WISCONSIN ALUMNI RESEARCH FOUNDATION★

MADISON
WISCONSIN

*A corporation not for private profit . . . founded in 1925 . . . to accept and administer, voluntarily assigned patents and patentable scientific discoveries developed at the University of Wisconsin. By continuous biological assays, the public and professional confidence in accurately standardized Vitamin D is maintained. All net avails above operating costs are dedicated to scientific research.

(Please use coupon on page 255)

THE answers to these and many other questions about the characteristics of crown and bridge cements and their uses are found in the booklet "Questions and Answers" just issued by this company for the information and guidance of the profession. You will want a copy in your office library. We will send it promptly with our compliments on request. **The W. V-B. Ames Company, Fremont, Ohio.**



(Please use coupon on page 255)

AMES DENTAL CEMENTS

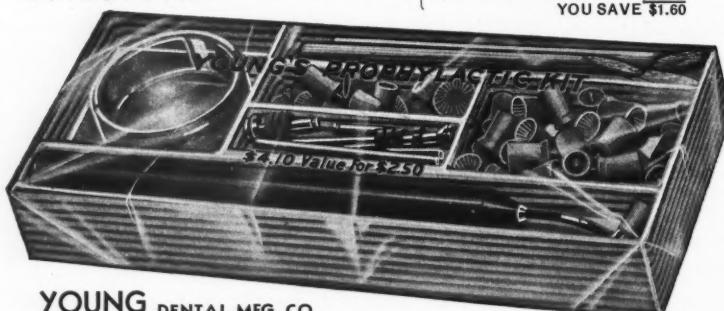
Please use coupons on pages 254-255
when writing to advertisers.

They are for your convenience.

SPECIAL OFFER

For thorough, rapid, gentle prophylaxis Young's polishing cups and specialties are superior! To induce you to try them we offer this \$4.10 value at \$2.50 FOR A LIMITED TIME ONLY. ACT NOW! Send no money—but mail coupon today. We will ship through your dealer.

1 Medicator & Masseur	\$1.00
6 M.&M. Rubber Cups	.35
36 assorted Polishers	1.80
1 YCO Mandrel (HP)	.20
1 YCO Mandrel (RA)	.20
1 Young's Mandrel (HP)	.05
2 Young's Mandrel (RA)	.20
1 Mixing Tray	.25
12 Prophylaxis Sticks	.05
TOTAL VALUE \$4.10	
FOR LIMITED TIME ONLY \$2.50	
YOU SAVE \$1.60	



YOUNG

DENTAL MFG. CO.

4958 Suburban R. W., St. Louis, Mo.

Gentlemen: Kindly send me a Young's Prophylaxis Kit together with full literature and reprints on use of these instruments, complete, at your special offer of only \$2.50.

Name _____ Address _____

Dealer _____

(Or please use coupon on page 255)

Mr. Burke, they realize that reader-interest and reader-respect are priceless assets—that it is commercially foolish to jeopardize those assets by "diluting" the editorial columns of their papers.

It would be folly for a manufacturer to engage a chemist, then demand that he include in a product's formula some ingredient which the chemist knew would upset chemical balance. It is the same sort of folly to demand that an editor include material against his will, material which in his opinion would jeopardize his editorial appeal, risk the loss of that which he labors to create and maintain: reader-interest and reader-respect.

It is a tribute to reputable manufacturers in the dental field that they seldom request editorial mention in the professional journals; that, when they do, they almost invariably offer material which would be acceptable if it were not imperative for editors to avoid even the "appearance of evil"; that they are quick to appreciate the editor's problem when he explains why he cannot grant their requests. Sad to relate, the most insistent demands customarily come from practicing dentists who are engaged in side-line commercial enterprises.

•

DESPISE Chief Justice Hughes' historic decision against advertising by dentists, there still exists appalling public ignorance of the fundamental reasons why advertising by individual dentists is banned by organized dentistry. A recent editorial in *Editor & Publisher* is an example of the prevalent misunderstanding. *Editor & Publisher* is devoted to the interests of daily and weekly newspapers. It really is a splendid journal and, while naturally it fights for newspaper publishers' interests, it never hesitates to condemn evils observed in its own field. Although the Hearst papers are liberal users of display space in its columns, *Editor & Publisher* quite frequently bitterly assails Hearst's Walter Winchell. A Hearst paper's "enterprise" in using rough tactics to photograph young Jon Lindbergh

The Principles of DENTAL MEDICINE

By F. W. BRODERICK, Hon. Dental Physician to the Royal Victoria and West Hants Hospital, London, England.

The new Second Edition covers all the advances in dental medicine and its relationship to general medicine. An especially fine discussion of the etiology, prevention and treatment of dental caries and pyorrhea is included. The book is divided into three parts, the first section covering General Physiological Considerations. Here the new material on Acidosis and Alkalosis, the Colloidal State, the Endocrine System, The Vegetative System, Diathesis and Constitution, Calcium Metabolism, The Nature and Origin of Disease. Part II—Dental Medicine. Introduction. Etiology of Dental Caries. Etiology of Pyorrhea Alveolaris. A Summary of the Previous Four Chapters. The Method of Investigation. An Introduction to Chemotherapy. The Preventive Treatment of Dental Caries. The Treatment and Prevention of Pyorrhea Alveolaris. The Aim of Medical Treatment. Part III—The Relation of Dental to General Medicine. Civilization as a Factor in the Problem. Dental Sepsis as a Factor in the Etiology of Disease. The Teeth in Allergic Diseases, Arthritis, Tuberculosis; The Teeth in Malignant Disease. The Teeth in Diseases of the Alimentary System. The Teeth in Diseases of the Respiratory System. The teeth in Diseases of the Nervous System. The Teeth in Diabetes. The teeth in Certain Diseases of the Skin. The Teeth in Diseases of the Eye. The Teeth in Acute Infectious Fevers. Some Illustrative Cases.

575 pages, 27 illustrations. Price \$7.50.

ANESTHESIA IN DENTAL SURGERY

By Sterling V. Mead, Washington, D. C.

There is no subject today of greater economic importance to the forward looking dentist than anesthesia. The selection of the anesthetic, the choice of technic, the accuracy of administration, all have a bearing on the results. In this book, recently on the press, is presented a complete manual on anesthesia in dentistry, both local and general. There is no anesthetic best for all cases, but there generally is an anesthetic best for each operation. This modern book on anesthesia provides the solutions to your daily anesthetic problems. Profusely illustrated, thorough in its coverage it is a book that will pay for itself many times over.

482 Pages Price, \$6.50 144 Illus.

DISEASES OF THE MOUTH

By Sterling V. Mead, D.D.S., M.S., B.S., Washington, D. C.

The ability to recognize pathological disturbances and to diagnose and treat these conditions successfully is a fundamental necessity in modern dental practice. This book supplies the dentist with the fundamental principles and practical knowledge necessary for routine work in making a correct diagnosis of abnormalities within the mouth, thus permitting a correct prognosis so that proper treatment may be applied more promptly and more efficiently. Every phase of diagnosis and treatment of diseases of the soft tissue is gone into carefully.

932 Pages 40 Color Plates Price, \$10.00 523 Illus.

A MEMO ABOUT SOMETHING YOU HAVE BEEN PLANNING TO DO

Most of us have traveled a long way since the day we left college with our diploma tucked under our arm. Dentistry, too, has travelled far in the intervening days. Day by day new discoveries have been made, new techniques developed. The cumulative result of this progress has brought many changes and advantages to practically every field of dental practice since the days when most dentists were learning the fundamentals in dental college.

The record of this progress is to be found in modern dental books. The help, instruction and counsel of the best minds in the profession are available to the forward looking dentist at little cost.

How many times have you decided that some particular book would be helpful to you—in some cases, decided to order it, and then, for some reason or other put it off?

How many times have you planned to fill up the gaps in your library, only to postpone definite action?

We need not remind you of the value of practical up-to-date books. Nor can we tell you the books you need most. You know more about this than we do. We can, however, remind you that books are easy to put off. They are also easy to buy.

Easy Payment Plan

The Mosby Easy Payment Plan enables you to stock your dental library with the working tools that you need—and to do this immediately. This plan entails no financial hardship. If your order is \$15.00 or less the monthly payments need be only \$3.00. If your order calls for more than \$15.00 worth of books divide the entire amount by six to arrive at the monthly payments. No down payment is necessary. Simply fill in the attached coupon, listing the books you want, then write your name and address plainly. The books you select will be forwarded immediately—PREPAID.

ORAL SURGERY

By Sterling V. Mead, Washington, D. C.

This book brings oral surgery well within the range of possibilities of the average dentist. Operations which were considered hazardous and beyond the province of the dentist a few years ago, are now readily performed. Day by day more oral surgery is being insisted to the dentist. This book brings oral surgery well within the range of possibilities of the average dentist. It is more than a comprehensive presentation of the subject. It is a step-by-step guide. Every operation is described in its progressive steps. Having this guide post in oral surgery means opening additional avenues of work and income.

1887 Pages Price, \$12.50 463 Illus.

PRACTICAL PEDODONTIA

By Floyd Eddy Horeboom, Professor of Children's Dentistry, College of Dentistry, University of Southern California.

Children's dentistry is a phase of practice the general practitioner can ill afford to neglect. Children of today grow up and become the fathers and mothers of tomorrow. Many important advances have been made in this field of dentistry. The newer methods of handling juvenile cases are discussed in this book which thoroughly covers the subject, including deciduous teeth, cavity preparation, root canal work, endocrinology, and public health dentistry.

328 Pages, 249 Illustrations. Price, \$6.50

PRACTICAL ORTHODONTIA

Dewey & Anderson

New Fifth Edition Revised by George M. Anderson, D.D.S., Professor of Orthodontia, Baltimore College of Dental Surgery. With the assistance of the following contributors: B. W. Weinberger, Sidney Riesner, B. H. Broadbent, H. E. Kelsey, Rudolf Kronfeld, A. P. Rogers, Earl W. Swineheart, C. F. Wright, E. B. Arnold and E. A. Kitlowski.

This book is wedded to no one idea or system, its purpose being to present in one volume authoritative information which will aid the general practitioner and the dental student in intelligently understanding orthodontia, and to assist the orthodontist in the interpretation and control of orthodontic cases. Starting with the first chapter, devoted to the principles of orthodontia, the subject is treated progressively through 25 chapters, thus giving the reader the etiology and principles involved before demonstrating the actual treatment of cases. Fixed and removable appliances are clearly described in both their construction and application. The treatment of cases is carried through step by step from beginning to end.

514 Pages Price, \$8.50 586 Illus.

PROSTHETIC DENTISTRY

By Ira Goodsell Nichols, D.D.S., Champaign, Illinois

An encyclopedia of full and partial denture prosthesis. Forty-five of the leading prosthodontists in America and Europe have collaborated with Dr. Nichols in the preparation of this work. It gives the general practitioner, prosthodontist, and laboratory technician a definite and scientific procedure in the construction of artificial dentures, contains the best in methods, materials, and instruments advanced by leaders in the profession. The technique is explained step-by-step and is thoroughly illustrated.

688 pages, 830 illustrations, 3 color plates. Price, \$12.50.

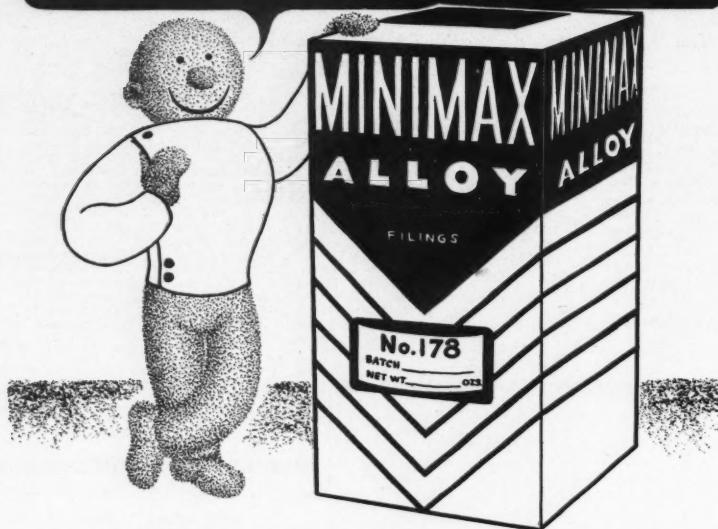
THE C. V. MOSBY COMPANY, 3525 Pine Blvd., St. Louis, Mo.

Gentlemen: Send me the following books: Nos. 1 (), 2 (), 3 (), 4 (), 5 (), 6 (), 7 (), charging my account. I agree to pay for these in accordance with your Monthly Payment Plan.

Dr. Address (Or please use coupon on page 255)

DD-7-36

Pardon us for being proud!



Your chest measurements are going to expand, too, when you make fillings with Minimax Alloy No. 178. The JOY of accomplishment we'll both feel and share—when we make the alloy and you make the filling!

In Minimax Alloy, properties are created to harmonious balance. There is no sacrificing of several properties to over develop one property that lends itself to forceful selling appeals. Minimax provides high crushing strength, adequate resistance to flow, ideal expansion and leak proof adaptation, over the wide range of practical techniques; pleasing carving, and the ability to receive and maintain a lustrous polish. Eloquent testimony of accomplishment is the vast, increasing number of critical dentists who purchase Minimax Alloy time after time, year after year. Let your next bottle be Minimax Alloy No. 178.

These LOW prices now in effect

5oz. \$1.50 per oz. 10oz. \$1.40 per oz.
20oz. \$1.35 per oz. 1oz. bottles \$1.60 per oz.

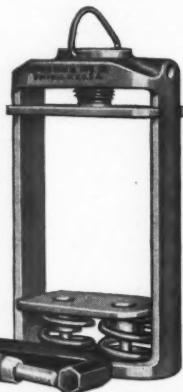
MINIMAX

The MINIMAX COMPANY
Medical & Dental Arts Bldg., Chicago, Ill.

Filings suitable for alloy-mercury gauges.
Complies with Revised (1934)
A. D. A. Specifications No. 1.



The
NEW
Buffalo
Spring
Compress



For use with all phenol resin denture bases and rubber.

Holds two flasks in a three case vulcanizer. Automatically lifts the flasks above the water line, and keeps them under constant spring pressure.

For vulcanite, it gives the much-desired "compensating" principle in vulcanization of rubber.

Made in Buffalo Bronze, it sells for \$5.75 complete as illustrated.

BUFFALO DENTAL Mfg. Co.
Kehr & Urban Sts. Buffalo, N. Y.

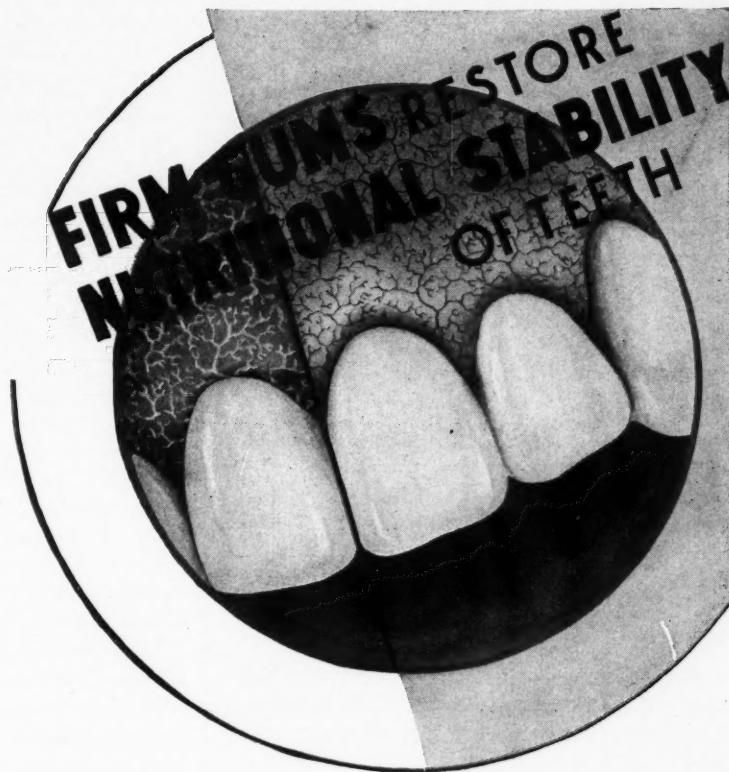
was also vigorously condemned. I am confident that if *Editor & Publisher* really understood the reasons why ethical dentists may not advertise it would be equally prompt to condemn the acceptance of such space by newspapers.

Here is an extract from the editorial: "The so-called 'ethical' dentists, following the lead of the non-advertising physicians, have created the general impression that a practitioner who advertises is not up to standard either in work or morals. The story of the advertising dentist of today is not heard, except in the local whispers permitted to him, and the public continues to believe that he is one of the quacks who used to operate on street corners under a glaring 'Painless' placard. He need not be.

"There is no reason why a skilled and ethical dentist should not seek the wider field for service that advertising affords him. If he is incompetent or extortionate, he will be found out the sooner by his advertising. If he is neither, but expert, and moderate in his fees, he is not deprived of the natural rewards of his merits. The latter consideration underlies most of the opposition to advertising, for the 'ethical' dentists' ranks are not free from bunglers and burglars, disgracing the title of 'Doctor.'"

Recommended reading for *Editor & Publisher's* editors—this paragraph from Chief Justice Hughes' decision, quoted in June, 1935, *Oral Hygiene*:

"The legislature was not dealing with traders in commodities, but with the vital interest of public health, and with a profession treating bodily ills and demanding different standards of conduct from those which are traditional in the competition of the market place. The community is concerned with the maintenance of professional standards which will insure not only competency in individual practitioners, but protection against those who would prey upon a public peculiarly susceptible to imposition through alluring promises of physical relief. And the community is concerned in providing safeguards not only against deception, but against practices which would tend to de-



is the ablest dental assistant.

Sturdy, vigorous gums contribute to dental nutrition by assuring adequate circulation in capillaries which have collapsed and short-rationed teeth.

IPANA massage stimulates capillary activity and restores nutritional stability of the teeth. Firm, healthy gums hold teeth solidly.

Brushing with Ipana safely cleanses and polishes teeth and keeps them sparkling and naturally white.

Sample on request

IPANA TOOTH PASTE



BRISTOL-MYERS CO.

19-S W. 50th STREET, NEW YORK, N. Y.

(Please use coupon on page 255)



Scientists Approve the Kolynos Formula

FOR 18 years Dr. N. S. Jenkins, a famous American dentist practising in Europe, had worked to develop an agent that would not only clean and polish the teeth but would also destroy the mouth bacteria which Professor W. D. Miller had previously demonstrated were the cause of tooth decay.

Dr. Jenkins carried out his final experiments in the United States and on the completion of his work in 1908 placed his formula, to which he had given the name "Kolynos", in the hands of one of the leading universities of this country for investigation. The result of this investigation substantiated the claims made by Jenkins that Kolynos reduced the number of bacteria to a marked degree. Numerous other tests and investigations were made by leading dental and medical authorities in the United States, Europe and Latin America, all of which proved the remarkable germicidal action of Kolynos Dental Cream.

Many theories on the cause and prevention of dental caries have been advanced since the Kolynos formula was originated. Whatever may be the underlying cause by which lessened resistance of the teeth to decay is brought about, recent scientific evidence supports the conclusion that the oral bacteria are the local agents that cause dental decay. Therefore Kolynos Dental Cream which destroys from 80 to 92 per cent of oral bacteria with each brushing may be regarded, through its daily use by the patient in the home, as a valuable aid in maintaining the sanitary condition of the mouth established in the dentist's office.

moralize the profession by forcing its members into an unseemly rivalry which would enlarge the opportunities of the least scrupulous. What is generally called the 'ethics' of the profession is but the consensus of expert opinion as to the necessity of such standards."

Last September *Oral Hygiene* published a colored map showing the progress so far made by organized dentistry in securing the enactment of anti-advertising laws. States which have succeeded in putting such laws on their statute books were shown in white, the others in brown. There are still too many "brown" states.

* * *

In recent years, a new type of advertising dentist has emerged. Most dentists are familiar with the "post-office prosthodontists" who are advertising mail-order denture service. This type was first exposed by *Oral Hygiene* many months ago. The most recent article appeared in the April issue, entitled "Putrescent Parcel Post"; the author was Doctor J. P. Leonard. Typical advertisements were reproduced.

Not long ago a friend of mine answered one of these advertisements for me and sent me the circulars he received along with the wad of impression compound which accompanied the circulars. This "postoffice prosthodontist" offers full uppers and lowers for as little as twelve dollars. He claims to have served more than 16,000 patients. This is likely true unless he is doing business at a great loss, for, judging from the number of magazines and newspapers in which his advertising appears, he must be spending real money for space.

This man must be the best prosthodontist in the whole world. He never sees his patients, they take their own impressions, yet he "guarantees" his work for life-long service! And by some occult power he knows his unseen patients are highly capable at impression-taking. "At any time during the procedure I want you to use your own judgment," he says. "Remember that I have confidence in your ability."

MERWIN B. MASSOL, *Publisher*

Increase
PATIENT-COMFORT



AND YOU IMPROVE PATIENT-CONFIDENCE

• There is more to a completely successful operation than merely the elimination of pain. There is comfort of your patients to be considered . . . upon which may rest the difference between "just patients" or advocates of you and your work.

Therefore, the first considerations in the selection of the proper anesthetic solution are compatibility with the tissues into which it is injected . . . pharmacologic accuracy and sterility.

Novocain-epinephrin solutions (Cook and R. B. Waite) combine these essentials with modern dentistry's require-

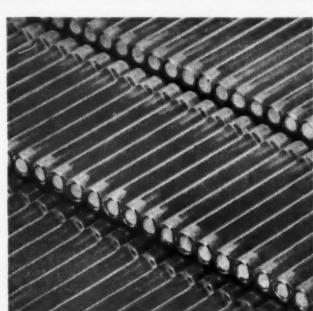
ments for simple and efficient formulas, which are both stable and sterile. Novocain with Cobefrin offers you these and more. The use of the new vasoconstrictor, Cobefrin in this solution possesses a high degree of patient-tolerance in normal and abnormal patients alike.

COOK - R.B.WAITE
CARTRIDGES - AMPULES - SYRINGES - NEEDLES

COOK LABORATORIES, INC.
The ANTIDOLOR MFG. CO., INC.
NEW YORK, N. Y.
Laboratories: Rensselaer & Springville, N. Y.

Carpule
REG. U. S. PAT. OFF. & CANADA

R.B.Waite
REG. U. S. PAT. OFF. & CANADA



Local Anesthetics of WIDE SCOPE

The successful use of Novocain with Cobefrin (Cook or R. B. Waite) in their exodontia, has revealed to many dentists the advantages of further extending their use of local anesthesia to conservative procedures. This solution is available in either the Cook or R. B. Waite formulas. Each possesses the same concentration of Novocain as the anesthetic agent, and Cobefrin as the vasocon-

strictor, but varies in the vehicle used to assure compatibility with the tissues and stability.

If you are not familiar with the difference, your salesman will explain it.

NOVOCAIN
with
COBEFRIN
(COOK - R. B. WAITE)

See second cover D.D.7

GENERAL ELECTRIC X-RAY CORP.
2012 JACKSON BLVD. DEPT. H-47
CHICAGO, ILL.

Send me complete information concerning the CDX X-Ray. I understand there is no obligation.

Dr. _____

Address _____

Dealer _____

See page 217 D.D.7

WERNET DENTAL MFG. CO.
882 THIRD AVE., BROOKLYN, N. Y.

Send me free supply of Dr. Wernet's Powder as mentioned in ad.

Dr. _____

Address _____

City _____

See page 218 D.D.7

WILLIAMS GOLD REFINING CO.
BUFFALO, N. Y.

Send me complete details concerning introductory offer mentioned in ad.

Dr. _____

Address _____

City _____

See page 219 D.D.7

AMERICAN CABINET COMPANY
TWO RIVERS, WIS.

Please send me new catalog manual—A-7-36.

Dr. _____

Address _____

Dealer _____

See page 220 D.D.7

RITTER DENTAL MFG. CO.
ROCHESTER, N. Y.

Please send complete information concerning Ritter Equipment. Also information concerning practice building service.

Dr. _____

Address _____

Dealer _____

See page 241 D.D.7

E. R. SQUIBB & SONS, DENTAL DEPT.
3207 SQUIBB BLDG., NEW YORK CITY

Attached hereto is my professional card or letterhead. Please send me a complimentary package of Squibb Dental Cream and the new Squibb Tooth Powder.

Dr. _____

Address _____

City _____

See page 242 D.D.7

KELLY-BURROUGHS LABY., INC.
143 N. WABASH AVE., CHICAGO, ILL.

Send complete information concerning Kelly's Paste.

Dr. _____

Address _____

City _____

See page 243

THE WANDER COMPANY
180 N. MICHIGAN AVE., CHICAGO, ILL.

Please send me, without charge, samples of Ovaltine for distribution to my patients. Evidence of my professional standing is enclosed.

Dr. _____

Address _____

City _____

See page 244

PELTON & CRANE COMPANY
632 HARPER AVE., DETROIT, MICH.

Send complete details concerning the new Pelton Localite. No obligation of course.

Dr. _____

Address _____

Dealer _____



« Immediately after a patient is supplied with artificial dentures the use of CO-RE-GA is indicated; to help create confidence in the ability to wear them with satisfaction and to dispel any mental uneasiness or fear of the dentures becoming displaced »



PLEASE SEND FREE SAMPLES FOR PATIENTS

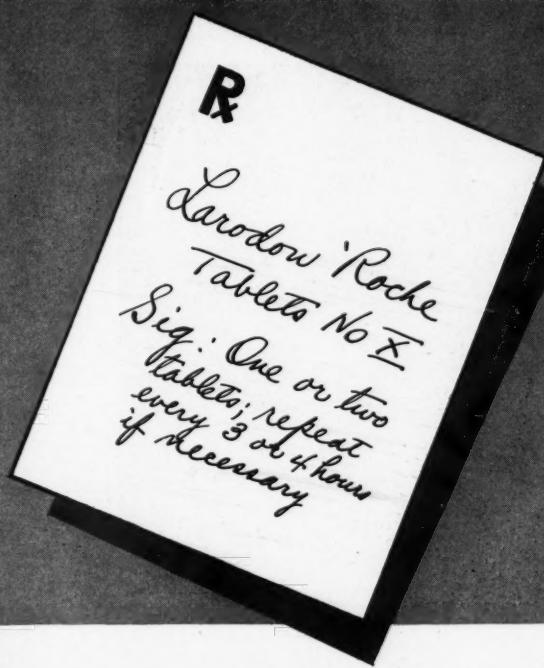
Dr. _____

COREGA CHEMICAL CO.

208 ST. CLAIR AVE. N.W.
CLEVELAND OHIO, U.S.A.

This Coupon is for Dentists use only

CO-RE-GA is not advertised to the public.



LARODON 'Roche'

for dental pain and tenderness

After extraction or other dental work to give much-needed relief of pain or tenderness. In most cases a few doses will be sufficient. Larodon (phenyl-dimethyl-isopropyl-pyrazolone) is not a narcotic.

Available in tablet form, in boxes of 10 and bottles of 100. A convenient form for pain-relief in headache, neuralgia, rheumatism, colds, sore throat, dysmenorrhea, post-extraction soreness, gingivitis, and toothache.

Nearly every drug store stocks Larodon also in powder form for extemporaneous prescriptions.



HOFFMANN-LA ROCHE · INC

ROCHE PARK · NUTLEY · N. J.

See Insert

D.D.7

BAKELITE DENTAL PRODUCTS, INC.
247 PARK AVENUE, NEW YORK CITY

Send booklet mentioned in ad please.

Dr. _____

Address _____

City _____

See page 245

D.D.7

EASTMAN KODAK CO., MEDICAL DIVISION
345 STATE STREET, ROCHESTER, N. Y.

Please send me a free copy of the booklet "X-rays in Dentistry."

Dr. _____

Address _____

City _____

See page 246

D.D.7

McKESSON APPLIANCE CO., TOLEDO, OHIO
Please send McKesson literature as mentioned in ad.

Dr. _____

Address _____

Dealer _____

See page 246

D.D.7

HU-FRIEDY MFG. CO.

3118 N. ROCKWELL ST., CHICAGO, ILL.

Send me full information on Osseous Reamers.

Send me one set of Osseous Reamers for 30 day trial.

Dr. _____

Address _____

Dealer _____

See page 247

D.D.7

WISCONSIN ALUMNI RESEARCH FOUND'TN
MADISON, WISCONSIN

Please send 32 page booklet mentioned in ad.

Dr. _____

Address _____

City _____

See page 248

D.D.7

YOUNG DENTAL MFG. CO.

4958 SUBURBAN R. W., ST. LOUIS, MO.

Kindly send me a Young's Prophylaxis Kit together with full literature and reprints on use of these instruments, complete, at your special offer of only \$2.50.

Dr. _____

Address _____

Dealer _____

See page 248

D.D.7

W. V-B. AMES CO., FREMONT, OHIO

Send me a copy of your booklet as mentioned in your ad please.

Dr. _____

Address _____

City _____

See page 249

D.D.7

C. V. MOSBY COMPANY, 3525 PINE BLDG.
ST. LOUIS, MO.

Send me the following books: Nos. 1 (), 2 (), 3 (), 4 (), 5 (), 6 (), 7 (), charging my account. I agree to pay for these in accordance with your monthly payment plan.

Dr. _____

Address _____

City _____

See page 251

D.D.7

BRISTOL-MYERS COMPANY

19-s WEST 50TH ST., NEW YORK CITY

Please send sample of Ipana.

Dr. _____

Address _____

City _____

See page 256

D.D.7

SCHERING & GLATZ, INC.

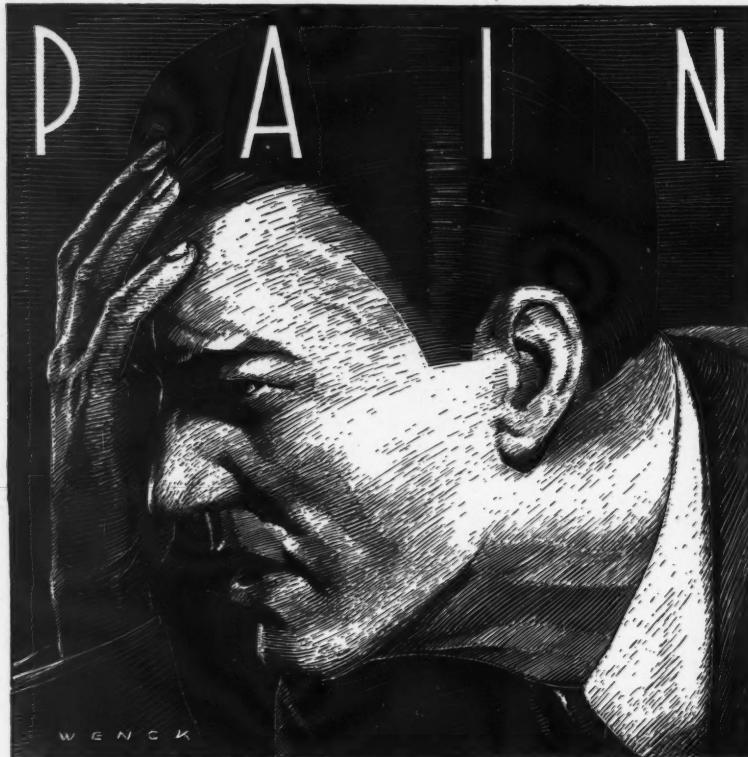
113 WEST 18TH ST., NEW YORK CITY

Please send trial quantity of Peralga as mentioned in ad.

Dr. _____

Address _____

City _____

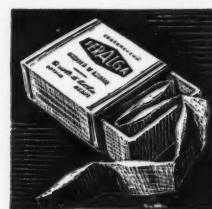


HEADACHE IS DISABLING

Headache may be as disabling as a grave illness. Migraine surely is. It is noteworthy how quickly the patient can obtain relief with Peralga. This non-narcotic analgesic and sedative combination of amidopyrine and barbital relieves pain quickly, yet does not cause drowsiness when the patient must remain at work. That is why Peralga is extensively prescribed in recurrent painful conditions, such as migraine and dysmenorrhea. Supplied in tablets and powder. Trial quantity sent on request.

PERALGA

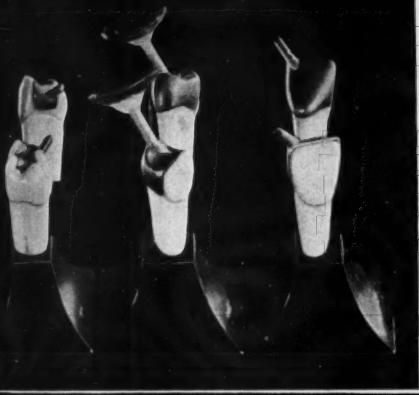
SCHERING & GLATZ, INC.
113 West 18th Street, New York City



(Please use coupon on page 255)

FOR
CASTINGS that FIT

**STEELE'S
SUPER INVESTMENT**



Photographs of representative inlay castings made in Steele's Super Investment, exactly as they came from the investment. No buffing or finishing has been attempted.



(Mirror placed in rear of specimens at time of taking photographs.)



Castings made with STEELE'S SUPER INVESTMENT can be distinguished by their precise fit, unusually fine detail and true gold color.

Each of these advantages reduces TIME, LABOR and COST in casting. Whether your next case is large or small, whether or not you are casting against embedded metals, USE STEELE'S SUPER INVESTMENT FOR BETTER CASTINGS.

THE COLUMBUS DENTAL MFG. CO. Columbus, Ohio, U.S.A.

Why New Trubyte Dentures are so Important to Appearance

WITHOUT TEETH THE FACE SAGS, THE CHIN APPROXIMATES THE NOSE AS IN OLD AGE.

2 THIS SHOWS WHY THE SKIN SAGS AND THE CHIN CLOSES UP THE NOSES WHICH ONLY IN TURN?

3 EASILY, JUST ONE TEETH RUIN THE APPEARANCE IF RUINED BY THE WRONG TEETH.

4 REJUVENATION WITH DENTURES IS MORE THAN JUST TEETH. AS SHOWN IN FIG. ABOVE, THE RIGHT DENTURES MEAN EVERYTHING IN APPEARANCE.

5 HOW NEW TRUBYTE TEETH ARE RELATED TO THE SURROUNDING PARTS, THUS RESTORING THE "FOUNDATION" FOR NORMAL FACIAL CONTOUR.

6 THE SMILE TELLS THE STORY. NEW TRUBYTE DENTURES FOR THE SAME PATIENT AS NO. 5 IT PAYS TO HAVE NEW TRUBYTE.

NEW TRUBYTE RESTORATIONS *Really* RESTORE!



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